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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Armstrong Celebrations

THOSE who attended the celebrations at Hampstead this week of the golden wedding of Professor H. E. and Mrs. Armstrong had the pleasure of seeing the veteran chemical teacher in the happiest of domestic settings, supported by Mrs. Armstrong, a woman as remarkable in her character and sphere as her husband has been in his, belonging to the type of women who make great careers possible to husbands and sons; surrounded by sons all distinguished in one way or another, and by a group of grandchildren that promise to carry on honourably the family tradition. It must have been a pleasant day for the venerable couple, looking back on a strenuous half century of life, and surrounded with ample reasons for contentment with its results. To Professor Armstrong, as a teacher of chemistry, however, what would appeal most would be the address presented by Professor Wynne on behalf of his old students at the Central Technical College, and their gift to him of his portrait, exhibited at this year's Royal Academy. Professor Armstrong's characteristic as a teacher was to train his students to think for themselves, and to shock them, and many other people, out of conventional and wooden ways of looking at things. It was inevitable that a mind of this quality should produce results both provocative and stimulating, and Professor Armstrong, with tongue and pen, has touched many a sensitive spot in his time. But at the end of it all he remains a great character, almost the last of a great generation of thinkers and scientists; picturesque and distinguished and highly individualist. The friends who gathered round him this week succeeded in conveying some sense of all this to him, and to that extent turned a domestic occasion into a public tribute.

Chemistry at the British Association

WERNER'S co-ordination theory has not, until recent years, received the attention that it merited. The steady accumulation of stereochemical and other evidence in its favour has, however, forced it into the foreground, and now that the electronic basis of the structure of co-ordinated compounds is beginning to be understood, some interesting developments may confidently be anticipated. It is gratifying to find that British chemists are to the fore among those who are endeavouring to link up Werner's views with modern ideas of atomic structure, and special interest therefore attaches to Dr. N. V. Sidgwick's presidential address on "Co-ordination Compounds" to Section B of the British Association at the Leeds meeting. This address and the discussion which followed it should serve to revive interest in inorganic chemistry, much of which, in the absence of some unifying principle such as the co-ordination theory, appears to the uninitiated eye to be a dreary waste of unrelated facts.

Two other discussions have been included in the programme. The first, which took place on Friday, was held jointly by the Physics and Chemistry Sections of the Association, and dealt with "The Structure and Formation of Colloidal Particles." In accordance with the pleasant tradition whereby foreign scientists are invited to be present at the deliberations of the Association, Professor H. Freundlich read a paper at this discussion, to which contributions were also made by Sir William Bragg and Professor R. W. Gray, among others. Next Monday the chemistry of the hormones is to be discussed by a very representative group of speakers, in which pure chemistry is represented by Professor G. Barger, biochemistry by Professors Raper, Drummond, and Barger, industrial chemistry by Mr. F. H. Carr, and medicine by Professor J. Mellanby.

As the meeting is being held at Leeds, it is natural that special attention should be paid to textiles. On Thursday, Dr. S. G. Barker, director of research to the Research Association for the Woollen and Worsted

Industries, read a paper on the " Fading of Dyestuffs." A visit was also made to the headquarters of the Research Association, where a garden party was held, the laboratories inspected, and a number of papers read, including one by Mr. A. T. King on " The Chemical Aspect of Wool Research." The Yorkshire chemical industry is also receiving its share of attention. Visits have been made this week to various works, including those of Wood Bros. Glass Co., where the processes involved in the general manufacture of glass and glassware were seen ; those of the Yorkshire Coking and Chemical Co., Ltd., where coke oven and by-product recovery plant was seen in operation ; and those of Hickson and Partners, Ltd., where the conversion of the crude benzol recovered from coke ovens to intermediates and dyestuffs was shown. Next week visits will be paid to the works of L. B. Holliday and Co., to see the general manufacture of dyestuffs ; and those of Joseph Watson and Sons, Ltd., where will be shown the various processes of soap manufacture, the distillation of glycerine, and the production of caustic soda. Altogether the programme exhibits a number of points of very unusual interest.

Fertiliser Raw Materials

THE important addresses on " World conditions as to mineral raw materials for the fertiliser industry," delivered at the Institute of Politics at Williamstown, Mass., and now collected together by the American National Fertiliser Association, make it clear that no nation is self-supporting in the matter of mineral resources necessary for the manufacture of artificial plant foods. France and Germany have ample supplies of potash. Germany is deficient in phosphates, but through the development of her synthetic nitrogen industry is independent of nitrates. France, by reason of her ownership of the Tunisian-Moroccan phosphate monopoly, is amply supplied with phosphates, but is dependent on other nations for her nitrates. Chile has a practical monopoly of natural nitrate of soda, but the development of by-product and synthetic ammonia has well-nigh destroyed her dominance of the world market. The British Empire, particularly through certain mandates, has ample resources of phosphate, but is largely dependent on other nations for potash and nitrate nitrogen. The United States is richly supplied with phosphate, has begun to develop a synthetic nitrogen industry, is already a large producer of sulphate of ammonia, and is trying to evolve a potash industry, which is expected to supply one-fifth of the annual need.

Although it is suggested that the United States has begun to develop a synthetic nitrogen industry, the address on " By-product ammonia in world trade," by Mr. C. J. Ramsburg, indicates that there are other views on the subject. Not much sulphate, it was stated, is being made in synthetic plants in the United States, and doubt was expressed as to whether any will be made. It was even hinted that in a short time there will be available for the by-product coke plant a process which will produce sulphate of ammonia from the sulphur and nitrogen originating in the coal, without going through the process of manufacturing sulphuric acid. Again, it is said to be apparent that there will be no open field for synthetic ammonia in the fertiliser market, that with the present rate of production in the United States all needs for sulphate will be supplied from by-product plants, and that this sulphate will be sold practically regardless of price, for it *must* be produced.

Further, a picture is given of the importance of the gas industry, and of the type of plant which has been adopted by the Consolidated Gas Co. of New York. In observing that 80 per cent. of the coke used in the metallurgical industries would be produced with the recovery of by-products, it is stated that with the Hunts Point plant the New York company will be carbonising approximately 700,000 tons of coal per year, using Koppers gas ovens. Apparently, this first unit would produce less than 15 per cent. of the gas distributed in the borough of Manhattan. The construction of another large plant in that vicinity, for one of the other gas companies, will soon be begun. It would appear that carburetted water gas now being produced in the United States is being manufactured at a higher cost than that of coal gas produced in modern coke ovens. Indications are not wanting to show that in a comparatively few years coal gas will replace water gas, as the base load of all gas plants, firstly because of the increasing cost of gas oil, and secondly, because of the increasing use of coke as a domestic fuel. This development will bring with it an enhanced production of by-product ammonia, and probably there is truth in the observation of Mr. Ramsburg, that " there will be no open field for synthetic ammonia in the American fertiliser market."

The Chemistry of " Traces "

THE correspondents who have recently written on this subject in THE CHEMICAL AGE are not alone in their belief in the important part played in dietary by inorganic salts. From various directions attention is being given to the effects of small quantities of such substances on the health of stock and to the need of ensuring that they are duly supplied. Major W. Elliot, M.P., the chairman of the Research Grant Committee of the Empire Marketing Board, in an article on " The Chemistry of Grass " in *The Times*, emphasises the point made by some of our own correspondents. From 10 to 15 per cent. of living matter, he states, consists of inorganic compounds, and about eight or nine elements, including calcium, phosphorus, and potassium, have been shown to be essential constituents. Others, like iodine, manganese, and fluorine, are found in traces, and were once thought to be accidental, but are now coming to be regarded as essential. The " chemistry of traces," both in organic and inorganic chemistry, is regarded by him as assuming a position of the first importance. In drawing attention to this matter again, one of our original correspondents asks : " Would it be too unchemical to stir up the agricultural world to the importance of the ' trace ' of fluorine (fluorides) in soils and plants and the animals feeding on them ? I am quite sure there is more importance to be attached to these traces of fluorine than has ever been imagined." There is certainly nothing " unchemical " in such a campaign ; it would merely be the kind of service that chemical science is supposed to

render to industry and civilisation. The subject is one of direct interest to such research organisations as that recently established by Nitram, Ltd.; probably, in fact, it is already under investigation as part of the propaganda scheme in support of chemical fertilisers.

Dr. Elliot, among the examples quoted, mentions that grass-eating animals, left to themselves, instinctively seek out pasturage rich in the so-called inorganic elements. Quite unlooked-for consequences sometimes result from restrictions that prevent cattle from roving. Confined within fences, they have been found to suffer from paralysis and bone-lesions, milch cows and growing stock being the worst affected. When the soil is fertilised by certain minerals, conditions improve. In South Africa it has been found that ptomaine poisoning results from creatures eating carcasses, and that this habit is due to their craving for phosphorus. The addition of digestible phosphorus-rich substances to the food, such as bone-meal, causes the cattle to abandon the habit, and with it disappears the disease. These problems and the studies they involve are all part of the chemical investigations now proceeding into the question of finding ideal plant foods and stock foods, and, as noted at the time of the Biarritz Conference, we may be on the eve of extremely important advances in this branch of research.

Some Flotation Methods

In summarising the operations of a number of important mining companies in the United States now operating flotation plants for treating oxidised ores, the Bureau of Mines points out that most operators pay considerable attention to the alkalinity of the pulp. Excess lime seems to have considerable effect upon the flotation conditions. The alkalinity is usually kept from nine to thirteen grains per gallon. Some of the operators use ferrous sulphate to reduce and control the alkalinity of the pulps. Other reagents, where the sulphate radical can readily be utilised, could be used. The pulp densities are usually kept about 25 per cent. solids. They vary, however, in some cases from 20 to 28 per cent. solids. Practically all of the plants crush the ore to pass a 65-mesh screen. Most of them crush to about 95 per cent. through 100-mesh and 60 per cent. through 200-mesh.

The common sulphidising agent is sodium sulphide of the commercial grade. This varies in quantities from one to five lb., commonly used in amounts proportional to the amount of material to be sulphidised. Calcium polysulphide has been used in some cases, but its use has been reported as being discontinued. The method of adding the sodium sulphide varies greatly. Some prefer to add the material to the ball mills or other grinding medium, while others add in solution form at different points in the flow line. It is generally conceded, however, that the reagent should have some little time to act upon the ore before being passed to the flotation circuits. This time may be arrived at by some experimental work. Most operators use in small amounts a relatively crude oil, which seems to stabilise the froth. Sodium silicate is added in some cases. It seems to assist the sodium sulphide somewhat, for the plants reporting its use also report the use of smaller quantities of sodium sulphide. Xanthate seems to steady and balance the flotation froth. Some of the plants, however, do not use this reagent. Reconstructed oils of various kinds are made. In most cases they are used especially to assist in the silver recoveries. Thiocarbanalide seems to improve the silver recovery in some cases. Cresylic acid, hardwood creosote, and pine oil are used mostly as frothing agents. Refined coal-tar products are used at some plants in place of the other frothing agents. While it would be difficult to forecast any reagent that might be best suited to a particular ore, experimenters are advised to try the oils and reagents in common use for this particular type of flotation.

German Patent Activity

Students of our Patent Literature—an indispensable field of study for every concern that hopes to keep abreast of new knowledge—must latterly have observed a notable increase in the number of new chemical patents taken out, especially in dyestuffs research. The increase is accounted for mainly by German applications, which illustrate the great activity in research which is at present proceeding. This flood of new patents is not necessarily a sign of important new inventions. It may sometimes be due, in fact, to slackness of trade and the need of finding new processes to stimulate it; it may also be largely superficial, since it is well known that many of the new patents are little more than "bluff" or a smart attempt to anticipate possible new discoveries on subjects which are under investigation. Two points, however, are of undoubted interest. The first is that the activity in taking out patents is almost entirely confined to chemistry. The second is that it comes mainly from Germany. Whether the German research has any definite objective is not so clear; it is, of course, common knowledge that they have been hard at work on coal research, and a new source of synthetic liquid fuel in a few years' time may be as well assured as the new source of synthetic nitrogen already is. The more general conclusion is that it is chiefly fundamental research of the kind which has no particular immediate object before it but which at any moment may open immense new possibilities. It is the German enterprise in this direction that the heads of British industry would do well not to overlook.

Books Received

Fertilisers and Soil Improvers. By W. Gardner. London: Crosby Lockwood and Son. Pp. 184. 7s. 6d.

The Artificial Silk Handbook. Compiled by Frank Nasmith. Manchester: John Heywood, Ltd. Pp. 144. 3s. 6d.

Report on the Competition of Industrial Designs, 1927. London: Royal Society of Arts. Pp. 30.

Oxwelded Roof Trusses. By H. H. Moss. New York: The Linde Air Products Co.

The Calendar

Aug. 31–Sep. 7	British Association for the Advancement of Science: Annual Meeting.	Leeds.
Sept 5–8	Third International Congress of Scientific Management.	Rome.
Sep. 6–9	Institute of Metals: Autumn Meeting.	Derby.
8–24	Shipping, Engineering and Machinery Exhibition.	Olympia, London, W.

The Structure of Co-ordinated Compounds

Dr. Sidgwick's Address to the Chemistry Section at the British Association

Werner's views on the structure of co-ordinated compounds have derived new strength and support from recent work on the structure of the atom. In Dr. Sidgwick's address, extracts from which are given below, the gains which will follow more extended application of the theory, especially in its electronic aspect, are indicated.

WHEN the British Association last met in Leeds, said Dr. Sidgwick, thirty-seven years ago, the attention of Section B was largely devoted to the discussion of ionisation, and at a joint meeting with Section A the new theory of Arrhenius was defended by van 't Hoff and Ostwald against the attacks of such conservative die-hards as S. U. Pickering and Professor H. E. Armstrong. That meeting might be taken as marking the recognition in this country of the distinction between ionised and non-ionised linkages.

Werner's Theory of Co-ordination, which was first put forward in 1891, originated in an attempt to explain the structure of certain compounds formed by apparently saturated molecules with one another. A large number of such compounds, often very stable, had been observed, but they were commonly disregarded by chemists, or were shelved under the convenient name of molecular compounds.

Werner's Theory

To explain these phenomena, Werner proposed a theory of molecular structure founded on entirely new principles: that it was determined by the tendency of atoms, irrespective of the periodic groups to which they belonged, to attach to themselves a definite number (usually six, sometimes four, and less often other numbers) of other atoms or groups, which might either be univalent radicals or whole molecules capable of independent existence. These groups together with the central atom formed the "co-ordination complex," and the groups were said to occupy the "first sphere" of combination of the central atom; the molecule might also contain other atoms or groups occupying a "second sphere," which were less firmly attached, and did not count as part of the co-ordination complex. For example, in the hexammine of platinic chloride $[Pt(NH_3)_6]C_4$, the ammonia molecules were regarded as occupying the first sphere of the platinum and satisfying its co-ordination number 6, while the chlorine atoms occupied the second sphere. Experimentally the groups in the second sphere were distinguished by the fact that they were ionised in water, while those forming part of the co-ordination complex were not.

Werner produced a great mass of evidence in support of these views; the chemical public in general did not, however, pay much attention to them until in 1911 Werner was able to show that certain compounds of chromium and other elements which, on his theory, should have asymmetric molecules could actually be resolved into their optically active forms. It then became evident that the theory must at least contain a large element of truth.

The final solution of the problem was scarcely to be expected until a more definite idea had been reached of the physical mechanism of atomic linkage, and this could only be attained when more was known of the structure of the atom. This development was reached, in the years from 1911 onwards, mainly through the work of Rutherford, Bohr, and Moseley. It was evident that the cause of chemical combination was the striving of atoms to attain more stable arrangements of their planetary electrons by some kind of redistribution.

Electronic Explanation of Polar and Non-Polar Links

The application of these ideas in detail to the explanation of valency was primarily due to Kossel and G. N. Lewis, who published their views almost simultaneously in 1916. Kossel dealt with ionised links. The more difficult problem of the non-ionised link, such as we find in elementary chlorine or hydrogen, or in methane, was explained by Lewis by the assumption that it is possible for two atoms, each of which is a few electrons short of a stable number, to share electrons. The view of the two fundamental kinds of linkage—ionised and non-ionised, polar and non-polar, or, as Langmuir had called them, electrovalent and covalent—that one was due to the transference and the other to the sharing of electrons between two atoms, had been confirmed by all subsequent discoveries, and might be taken to be generally accepted.

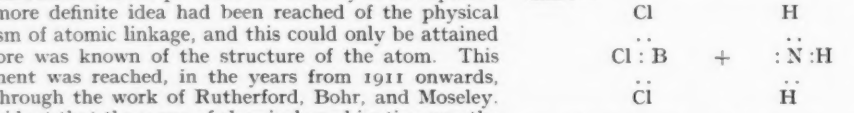
They had therefore got an electronic mechanism which would account for the two recognised forms of valency, the ionised and the non-ionised. If these were really the only two forms of linkage which could exist in a molecule, it must be possible to extend them so as to account for co-ordination. This was in fact surprisingly simple. It was clear that the link which attached one of the groups of a co-ordination complex to the central atom was of the non-polar type. It was an essential point in Werner's theory that such links were not ionised. They must therefore look for an explanation of co-ordination in the formation of covalencies, of links formed of pairs of shared electrons. But they must arise in some way different from that which they had hitherto assumed, since their numerical relations were different; their number was not related to the periodic group of the central atom, and also they could be formed with atoms (such as the nitrogen in ammonia or the oxygen in water) which had already completed a stable number of electrons.

Now in the normal covalency formation described above it was assumed that one of the two shared electrons of a link came from each of the two atoms concerned. It was obviously possible that both might be derived from one of them; and the recognition of this possibility was all that was required to provide an electronic mechanism for co-ordination. By means of this extension of the idea of covalency formation they could explain all the peculiarities of co-ordination compounds.

Formation of Co-ordinated Compounds

In nitrogen there were five valency electrons; by combination with three hydrogen atoms this number was increased to eight, giving a molecule of ammonia, in which the octet of the nitrogen was complete and the atom was so far saturated. But, though complete, the octet was not fully utilised; six of its members were shared with the three hydrogen atoms, but the other two were unshared, and so could form a fourth link if another atom could be found which would share them without sharing some of its own electrons with the nitrogen in return. Again, boron had three valency electrons; it could share one of them with each of three chlorine atoms (thus completing the octets of the chlorines), and at the same time take a share in one of the electrons belonging to each of the chlorines. This gave boron trichloride BCl_3, in which the boron had increased its valency group from three to six.

The boron could combine with a fourth chlorine atom, because, although its own octet was not complete, it had no more unshared valency electrons to offer for a covalent link. But if it met an ammonia molecule it could share the unshared pair of electrons of the nitrogen, and so form a co-ordinate link:—



In this way each of the two atoms assumed a covalency (or, if they preferred to call it so, a co-ordination number) of four.

The conditions for the formation of a co-ordinate link thus were that they should have one atom which had a pair of unshared valency electrons to offer, and another which had room for one or more pairs of electrons in its valency group. It was convenient to have a symbol and a nomenclature to express that process, and he therefore suggested that, while the ordinary covalent link was represented by a line A—B, the co-ordinate link should be written as an arrow A→B, pointing away from the atom which contributed the two electrons of the link; also they might call the atom which lent the electrons (A) the donor, and that which received them (B) the acceptor.

They had now to apply these ideas to the compounds on which Werner based his theory. Any simple cation—that is, an atom stripped of its valency electrons—could act as an acceptor. It could build up a valency group by sharing electrons belonging to other atoms, that is, by forming co-ordinate links. Thus the chromic ion $[Cr]^{+++}$ contained a stable core of twenty-one electrons and had no valency group; the stability

of this arrangement was proved by the stability of the chromic salts. That ion could then form a series of co-ordinate links with molecules of ammonia, by sharing the "lone pair" of electrons of the nitrogen atom. Since the stable size of the valency group for such an ion was 12, six molecules of ammonia would be taken up, and in this way the hexammine $[Cr(NH_3)_6]Cl_3$ was produced.

In this way the conception of the co-ordinate link as being a covalency, that is, a link of two shared electrons, differing from the ordinary covalency only in this, that the two electrons both came from one of the linked atoms instead of one from each, provided the mechanism required to explain the existence and the properties of the co-ordination compounds of Werner. This conclusion removed the apparent contradiction between organic and inorganic compounds; it referred the structure of molecules of both classes to the same physical principles, and exhibited the original co-ordination theory of Werner and the older structural theory as two aspects of the same general process.

Number of Co-ordinated Groups

They had already seen that the formation of a co-ordinate link involved the presence of one atom which could act as a donor and another which could act as an acceptor. The donor must have a pair of unshared valency electrons. The acceptor must have fewer valency electrons than it was capable of holding. This raised the question of the maximum size of the valency group. If they held to the original octet theory, that the valency group could exceed 8, and at the same time that every covalency involves two shared electrons, it followed that the maximum covalency could not exceed 4. The existence of stable compounds such as sulphur hexafluoride showed that this conclusion was false, and hence that one or other of the two assumptions must be abandoned.

He would abandon the limit of 8 for the valency group (as G. N. Lewis had now done), and adhere to the view that in all but a few unstable compounds every covalency involved two shared electrons. On these principles the maximum size of the valency group was twice the covalency or co-ordination maximum. An examination of the structures of known compounds gave strong reason to believe that there was a direct and simple relation between the maximum covalency (co-ordination number) of an atom and its position in the periodic table, and that this depended not on the periodic group but on the period in which it occurred, so that the co-ordination classification ran horizontally, while the normal valency values ran vertically.

It would take too long to discuss the evidence for this statement, but he might give the conclusions. The maximum covalency of hydrogen was 2: that of elements in the first short period (lithium to fluorine) was 4: that of elements in the second short period (sodium to chlorine) and the first long period (potassium to bromine) was 6: and that of the later elements was 8. The maximum number of electrons in the valency group was, of course, twice as great, being 4, 8, 12, and 16, respectively. No physical reason for these facts could as yet be given, but a certain relation could be traced between the numbers and those in the grouplets of the Bohr theory as modified by Stoner and Main Smith.

The next question was the difference in properties which was to be expected between the normal and co-ordinate covalencies. These were essentially of two kinds. In the first place the co-ordinate links were in general less stable. The stability of a link depended on the work required to break it, or, in other words, on the difference of energy content between the original molecule and the products of the rupture of the link. Hence, the more unstable these products were, the more difficult it was to break the link. The rupture of a normal covalency led to the production of two univalent radicals

$$A:B \longrightarrow A\cdot + \cdot B$$

that is, of two highly unstable products. But a co-ordinate link could break by the return of the two shared electrons to the atom to which they originally belonged

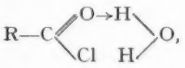
$$A:B \longrightarrow A + :B$$

and one at least of the products was now a molecule capable of independent existence. Thus, the products of the rupture of a co-ordinate link were, as a rule, more stable than those formed by breaking a normal covalency, and the co-ordinate link was therefore less stable. This difference was particularly marked in rings containing co-ordinate links, those which Prof. Morgan had called chelate rings; these were far more sensitive to strain, owing to the weakness of the co-ordinate link, than the ordinary rings of organic chemistry; while the latter were known of every size from three to eighteen members, chelate rings almost invariably contained either six or five; a few 4-rings were known and one or two 7- and 8-rings; but none with less than four or more than eight members. This explanation of the difference in strength between normal and co-ordinate links was of considerable importance.

Among the more important developments of the theory of co-ordination which must be expected in the near future, its systematic application to organic chemistry must take a high place.

The Position of Carbon

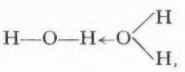
The carbon atoms in an ordinary saturated organic compound had fully shared valency groups of the maximum size. They were therefore incapable of the most obvious form of reactivity, which began by co-ordination with a reagent molecule; if they were to react at all, it must be through some other atom in the molecule. It was a significant fact that one of the most elementary rules of organic chemistry was that a carbon atom united only to other carbon atoms or to hydrogen or the halogens was very slow to react, but that the introduction of a single oxygen atom into the molecule facilitated reaction. It seemed natural to relate this effect to the strong donor properties which oxygen exhibited, and to suppose, for example, that the rapid hydrolysis of an acyl halide was due to the formation through the oxygen of a compound



in which the hydrogen of the water was brought into close proximity with the chlorine, while the relative inactivity of an alkyl halide was the result of its inability to form such a compound.

He made these suggestions (which might easily be extended) because it seemed to him that in the intensive modern study of the influence of structure on the reactivity of organic compounds this side of the question had been too much neglected. We knew now that even in purely "organic" compounds co-ordination was of frequent occurrence.

The co-ordinated hydrogen, for example, as in



was attached to each of the two oxygen atoms by means of two shared electrons. The link on one side was just as genuine as that on the other, although, owing to the difference in the states of the two oxygen atoms, one of them separated more easily. It therefore seemed probable that the formation of such a link might often be a preliminary stage to the complete transference of the hydrogen from one point of attachment to another, and that the possibility of its formation might be a necessary condition of reaction. They had further to recognise another way in which reaction might be promoted by co-ordination, which was illustrated by the example he gave of the hydrolysis of an acid chloride. The formation of a co-ordination compound between two molecules might bring two atoms into proximity with one another, and so favour their reaction.

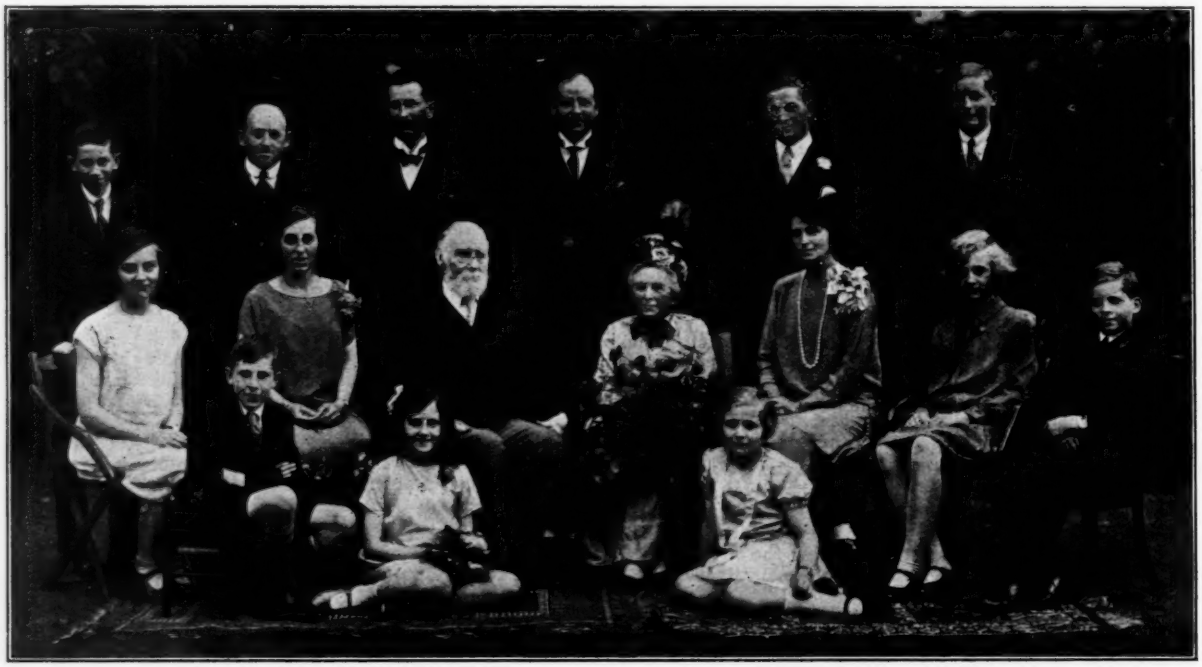
He had tried in these remarks to emphasise the fact that the modern electronic interpretation of the theory of co-ordination had a value far outside the range of those compounds which the theory was originally devised to explain. There was too great a tendency even now to regard the question of co-ordination as one which was of interest only in connection with a highly special group of substances which the ordinary chemist rarely met, whereas in truth the study of this question had given them a wider and a truer conception of the nature of the processes by which molecules were built up. The determination of the factors which influenced chemical reaction was perhaps the most important of the fundamental problems of chemistry, and it was essential that the factor of co-ordination, with the new possibilities of reaction-mechanism which it opened up, should be recognised and investigated.

Golden Wedding of Professor and Mrs. Armstrong

Presentation of Address and Portrait

THERE was a very pleasant gathering of scientists, old students, relatives and friends, on Tuesday afternoon, to celebrate the golden wedding of Professor Henry Edward and Mrs. Armstrong, at the Haverstock Hill residence of their son-in-law, Dr. Stephen Miall. Professor Armstrong, wearing his familiar brown velvet jacket and vest, was in his gayest mood, and Mrs. Armstrong, surrounded by her sons, daughters, and groups of younger relatives, seemed no less happy.

Dr. E. F. Armstrong, the eldest son, in informal terms, proposed the health of the "bride and bridegroom." That, he said, was the second time that a golden wedding had been held in the family, and it looked like becoming a family habit. In 1888 his mother's mother and father celebrated their golden wedding, and several who were present then were present now. They would all join with him in the feeling of pride that their mother and father had been spared to live in happiness and health until that day, and to see them after fifty years looking so young and in such splendid spirits. It was not an occasion for many words, and on behalf of the family and guests he offered their best wishes for health and a continuance of their enjoyment of life that was such a marked characteristic of them.



Special photograph by Langfier, Ltd., London.

THE ARMSTRONG GOLDEN WEDDING: A FAMILY GROUP.

An Address from Old Students

Professor W. P. Wynne, of Sheffield University, next presented to Professor Armstrong an address on behalf of his old students of chemistry, and asked his acceptance of his portrait, by Mr. T. C. Dugdale, exhibited at this year's Royal Academy. The address was in the following terms:—

PROFESSOR AND MRS. HENRY EDWARD ARMSTRONG

"Your staff and students of chemistry of former years greet you with affectionate regard on this happy occasion of your golden wedding. As they are scattered all over the world, only a comparatively small body of them can subscribe to this personal letter of greeting, but in so doing and in endeavouring to honour their chief and his lady, they know they are voicing the good wishes of all their colleagues.

"They know, Professor Armstrong, that by your teaching, your breadth of vision and your scientific use of the imagination, coupled with a sympathetic guidance and a real human understanding, you have inspired those who have been privileged to work with you to their lasting benefit. The consciousness of this grows with them; so, with perhaps a pardonable pride, they have purchased your portrait in this year's Royal Academy to mark the present occasion. They ask your acceptance of this portrait for the period of your lives, earnestly trusting that such useful lives may long be spared. Eventually, however, they propose presenting it to one of the London learned societies in commemoration of a striking personality and as a lasting record of their appreciation and affection."

Mrs. Armstrong, who was called upon by her husband as the "senior partner," to speak first, thanked Dr. Wynne and those for whom he spoke for the kind things he had said about her husband, and expressed their happiness at having around them so many relatives and friends on such an occasion. She remarked that while her husband always thought that he was having his own way, she might now safely confess that, in fact, she had always had hers.

Professor Armstrong, in his reply, at once reminded the family that they owed everything to their mother. Fifty years ago that day was the most anxious day of his life. He was as a lamb led to the slaughter, and did not know whither he was going. At that time he had no fixed position and he was naturally very anxious. They were regarded as rather an ill-assorted couple. He was really in love with his mother-in-law, whose wonderful charm and good temper were known to all, and it was his anxiety to become related to her that explained his marriage to her daughter. His wife practically insisted on his marrying her. He put every obstacle in the way without success. She declared that she would never marry him while he persisted in wearing a black tie, but he wore it and she still married him. After fifty years he could say that she was as good as

(*Continued on page* 217)

(*Continued from page 216*)

her mother, and he could not well give higher praise. Their children might feel that they had been brought up with fair respect for the decencies of life. They were all well able to look after themselves, and there had been attracted into the family others of whom the same might be said. He cordially thanked Dr. Wynne and those for whom he spoke for what they had done that day, because it indicated that his work as a teacher had not been entirely without effect. The compliment they had paid him was a very high one, and he deeply appreciated it.

Some of the Guests

The members of the family present included in addition to Professor and Mrs. Armstrong, Mr. Robert Adkin and Mrs. Adkin (sister to Mrs. Armstrong), Miss Lavers (sister to Mrs. Armstrong), Dr. E. F. Armstrong (son) and Mrs. Armstrong, Dr. R. R. Armstrong (son) and Mrs. Armstrong, Mr. H. Clifford Armstrong (son) and Mrs. Armstrong, Mr. Harold Armstrong (son) and Mrs. Armstrong, Dr. Stephen Miall and Mrs. Miall (daughter), Miss Norah Armstrong (daughter), and a number of grand-children and other relatives.

The other guests included Sir William Pope, Professor W. P. Wynne, Mr. and Mrs. E. V. Evans, Dr. and Mrs. Heller, Lady Byles, Lady Pearce, Professor H. Brereton Baker, Mr. and Mrs. F. H. Carr, Dr. and Mrs. Foster Morley, Sir Richard Gregory (editor of *Nature*), Dr. Eyre, Dr. R. Seligman, Mr. F. E. Hamer (THE CHEMICAL AGE), Mr. J. Arthur Williams (Chemical Industry Club), and many others.

Wages in the Dyeing Trade

THE negotiating sub-committees of the Allied Association of Bleachers, Dyers, Printers and Finishers, and of the Joint Dyers' Executive (the latter representing some 80,000 operatives in the dyeing industry) met in Manchester on Tuesday, August 23, to discuss terms of reference for the purpose of opening up negotiations on the question of adjustments in the wage rates of time workers, and other matters to be agreed upon. The conference failed to arrive at any agreement. The meeting followed the agreement signed by the parties last April, when it was arranged that the Mackenzie Award should be cancelled as from the first pay day in November. This decision means that adult male operatives will lose 2s. per week and female operatives (18 years of age and over) 1s. 3d. per week, but there is a clause which opens the way to wage negotiations which might have the effect of nullifying the cancellation of the award. This reads: "That a joint committee, representative of the unions and employers concerned, be appointed to agree to terms of reference for the purpose of opening up negotiations on the question of adjustments in the wages rates of time workers and other matters to be agreed upon by such Joint Committee."

The Joint Dyers' Executive have taken advantage of this to formulate terms of reference which will secure to the operatives an increase in basic rates, or a weekly advance to piece workers, and so counteract the effect of the loss of the Mackenzie Award. A document embodying these terms was presented to the employers at the meeting, and the Allied Association also submitted their terms, but the conference failed to arrive at agreement.

The "Micro-Manipulator"

BY means of the "micro-manipulator," an apparatus by means of which pipettes, tweezers, etc., may be accurately moved distances such as one-thousandth of a millimetre, Professor Peterfi is reported (according to the German Press) to have succeeded in isolating single bacilli and bacteria, and in dissecting them into any desired number of parts. There are thus opened new possibilities for the study of the behaviour and properties of small organisms as well as other small objects, such as the particles in chemical mixtures and suspensions.

Isopropyl Alcohol Regulations

IN pursuance of the powers conferred by Section 16 of the Finance Act, 1927, the Commissioners of Customs and Excise have made the Isopropyl Alcohol Regulations, 1927, under which every manufacturer, seller and user of isopropyl alcohol is required to furnish information as to the manufacture, sale and use of isopropyl alcohol. A notice (No. 157) explaining the requirements may be obtained on application to the Secretary, Custom House, London, E.C.3.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

72 (*Plant for the manufacture of Saccharin*).—A firm in India is anxious to get into touch with firms specialising in plant for the manufacture of saccharin.

Ammonia for Gas-Oven Hydrogen

Recent German Developments

A FURTHER step forward in the policy of by-product exploitation (states the Rhineland correspondent of *The Times*) on the part of the Ruhr coal industry is provided by the present activities of the Gasverarbeitungsgesellschaft G.m.b.H., in Sodingen, near Dortmund. This limited company was recently formed by the Mont Cenis and Hibernia mining concerns, and the construction is well under way of new works at the Mont Cenis mines for the reclaiming from cokeries of nitrogen and hydrogen intended chiefly for the manufacture of synthetic ammonia. The gas from the Ruhr cokeries contains ordinarily about 50 per cent. of hydrogen. The old method was to utilise this for heating boilers and coke furnace batteries, for which purposes inferior combustible agents can be used with equal satisfaction. In the form of a mixture of nitrogen and hydrogen, requiring no subsequent purification, this by-product gas can now be derived from the cokeries at a cost of a little less than one pfennig per cubic metre. Six cubic metres of cokery oven gas are required to obtain one kilogram of latent nitrogen, and in the course of the process about two cubic metres of other gas which can be used for heating or lighting purposes are recoverable. The Mont Cenis Co. have also invented a process of their own for synthesising ammonia from the hydrogen-nitrogen mixture derived from the cokeries. The production of this synthetic ammonia, which will be marketed in the regular way, through the German Nitrogen Syndicate, is shortly to begin on a large scale. The undertaking provides an interesting example of the manner in which the Ruhr coal industry is encroaching on certain domains until recently monopolised by the I. G. Farbenindustrie. There is no question of a "trade war" between the Ruhr mining industry and the German chemical trust in this field, as nitrogen production represents one of the chief activities of the I. G. Farbenindustrie and can remain only a side issue in the case of the coal industry.

Canadian Record Production of Gypsum

ACCORDING to finally revised statistics gypsum production in Canada advanced to a new high mark in 1926. Increases in tonnages shipped were recorded in all producing provinces except New Brunswick. The total production for the year was 883,728 tons, worth $2,770,813, as against 740,323 tons, at $2,389,891, produced in 1925. Canadian crude gypsum exported, principally to the United States, amounted to 668,064 tons in 1926. Ground gypsum and prepared wall plaster exported during the year totalled 10,062 tons. The United States, Newfoundland, Australia, and New Zealand were the principal importers of these materials. Capital employed in this important mining industry in 1926 was reported at $6,696,077.

American Acquisition of British China Clay Works

THE Paper Makers' Importing Co., of Easton, Pa., U.S.A., have acquired the well-known works of the Anchor United China Clay Co., Ltd., and the Melangoose China Clay Co., in the St. Stephens district, St. Austell, Cornwall. Mr. S. H. Knight, the president of the American company, and Mr. C. Bryan, the vice-president, have often visited the district, more so of late, in anticipation of being able successfully to negotiate the purchase of clay works of their own. It is stated that the capacity of the works is 50,000 tons per annum and that the Paper Makers' Importing Co. intend to push forward development operations and to this end will install new and up-to-date plant.

From Week to Week

MR. F. PENMAN has been appointed assistant research chemist to the Department of Agriculture, Victoria.

A FIRE BROKE OUT at the Neptune Oil and Grease Works, Swansea, last week, but was extinguished before much damage could be done.

EXPERIMENTS IN THE INTENSIVE MANURING of pasture grass are being carried on by Nitram, Ltd., at Priory Farm, Armathwaite, Cumberland, where Sir James Watt, head of the firm of Little and Ballantyne, nurserymen, of Carlisle, carries on intensive agricultural activities.

SIR VINCENT CAILLARD, who for 27 years has been a director of Vickers, Ltd., and who was mainly instrumental in arranging for the recent reconstruction of the company (which is now practically completed) has tendered his resignation, effective from September 1, which has been accepted.

THE THIRD INTERNATIONAL CONGRESS OF SCIENTIFIC MANAGEMENT will take place in Rome from September 5–8. The classes of problems connected with scientific management which will be discussed will include industries, and trade in industrial products, and agriculture, and trade in soil products.

SIR FRANK BAINES, who was recently appointed consultant to Imperial Chemical Industries, Ltd., on all architectural and constructional matters, retired from the post of principal architect to the Office of Works on Thursday. His new appointment will not necessitate the abandonment of his voluntary work in connection with the preservation of historic buildings and old cottages.

SUGAR BEET NEWS.—It is proposed to erect a beet sugar factory on the banks of the Wye or its tributary the Lugg, and the City Council is negotiating with an Anglo-Dutch concern for the erection of a factory. Opposition to the scheme is offered on the grounds that the effluents from the factory would destroy the West Coast salmon fisheries, one of the most valuable in the country, since the Wye is an extensive spawning ground.

THE BRITISH ENGINEERING STANDARDS ASSOCIATION have decided to remove all reference to the basic bessemer process from the British Standard Specification No. 9, 1922, bull head railway rails, and No. 11, 1926, flat bottom railway rails, since the use of this process is no longer in accord with British practice. Effect has been given to this decision by the Association in the current editions of the specifications of slips giving the detailed alterations required to the clauses affected.

AN EXTRAORDINARY GENERAL MEETING of the Vereinigte Glanzstoff Fabriken has approved of the increase of the share capital by 18,300,000, to 60,900,000 marks (£915,000 to £3,045,000). It was stated that the extension of the company's own works at home and abroad was making further progress, while the works at Cologne, constructed jointly with Courtaulds, were nearing completion. New shares to the value of 9,600,000 marks will be handed over to a foreign consortium.

THE ROTHAMSTED EXPERIMENTAL STATION at Harpenden of the Lawes Agricultural Trust are sending out to county organisers, chambers of agriculture, agricultural colleges, farm institutes, and to county secretaries of the National Farmers' Union a circular notice describing the field experiments on the manuring of root crops and old meadow land. The secretary will be glad to arrange for parties to be conducted round the experimental plots at any time before lifting. At least three hours should be allowed for a tour round the farm.

"SUPREME" VORTEX SEPARATORS for removing solid and liquid impurities from air, gas, and steam are described in a catalogue received from William Alexander, 167, St. Vincent Street, Glasgow. The separators have no moving parts and act by virtue of either the centrifugal force or the momentum of the particles, which are thereby projected against the surfaces of the separating chamber or against internal baffles or other objects in their path, or by gravitational force in settling chambers of large volume in which velocity is correspondingly low. Apart from small types for boilers, there is a large separator for the separation of tar from blast furnace gas.

THE CEYLON "GOVERNMENT GAZETTE" for June 2 contains the text of rules which have been made under the provisions of the Petroleum Ordinance, 1887, regarding transport, import, and storage of acetylene and calcium carbide. Under these rules, acetylene when liquid or when subject to a pressure above that of the atmosphere capable of supporting a column of water exceeding 100 in. in height, and whether or not in admixture with other substances, shall be deemed to be dangerous and may not be imported, transported, stored, or sold except under certain prescribed conditions. In addition to other regulations, calcium carbide may only be brought into harbour in hermetically closed metal vessels, having no copper in their construction, containing each not more than 224 lb., distinctly labelled in red letters as "Calcium Carbide, Dangerous," whilst the importation is prohibited of calcium carbide which contains impurities liable to generate phosphoretted hydrogen or siliciuretted hydrogen so as to render the gas evolved liable to ignite spontaneously.

MR. T. P. MCARLY has resigned his position of chief chemist to the Mount Lyell Mining and Railway Co., Tasmania.

DR. J. M. KOLTHOFF, of the University of Utrecht, has been appointed professor of analytical chemistry in the University of Minneapolis, Minnesota, U.S.A.

PROFESSOR M. BERGMANN, director of the Kaiser Wilhelm Institute for Leather Research in Dresden, has been elected president of the International Society of Leather Trades Chemists.

THE FRANCO-GERMAN COMMERCIAL AGREEMENT permits of the entry into France on the minimum tariff of certain chemical products: while certain others (200 in number) with the benefit of a new tariff.

MR. CHARLES C. CONCANNON, chief of the chemical division of the Bureau of Foreign and Domestic Commerce, Washington, D.C., has been on a visit to Europe. After a stay in England, he is leaving for Paris and then returning to the United States.

THE SECRETARY OF MINES made a notice last week ordering that antierost gelammonite No. 1 and hawkite No. 3 have been added to the schedule of permitted explosives in coal mines. By the same order, driftex, sabulex, and plastex being no longer manufactured, are removed from the schedule.

SHAREHOLDERS OF THE NUERA ART SILK CO. have been informed that the final option on the Lilienfeld patents, for the manufacture of new artificial silks, has been exercised by Courtaulds and Glanzstoffs. Courtaulds, it is stated, will take a proportion of the Nuera Co., which is making every effort to get production of the new silks on a commercial scale at the earliest moment.

THE CHILEAN GOVERNMENT is said to be discussing the possibility of the attachment of a "fall" clause to the sales of nitrate. This was done successfully when there was uncertainty about future prices in the last quarter of the 1926–27 nitrate year. The action of the Government is thought to show that it is contemplating the reduction of the export duty as from June 30, 1928.

MR. H. TALBOT, M.I.Chem.E., B.Sc., A.R.C.Sc., general manager of the Welsbach Light Co., Ltd., and until recently hon. secretary of the Chemical Engineering Group of the Society of Chemical Industry and a joint hon. secretary of the Fuel Section of the Society, is a delegate of the Society of British Gas Industries to the International Commission on Illumination, which began in Bellagio on Wednesday.

THE CEREMONY of driving the first pile for the foundations of the University College of Hull was performed on Wednesday, August 24, by Mrs. A. E. Morgan, the wife of the principal. The College will be built on a site of 46 acres situated on the Cottingham Road. Contracts for the superstructure will shortly be let, and it is hoped to have a portion of the College ready for students about the end of October, 1928.

AN ARTIFICIAL SILK FACTORY, controlled by Italian and Australian capital, is to be erected at Hobart, Tasmania. The Australian capital is said to have been subscribed. Two thousand workers will be employed in the factory, of whom 200 will be Italian experts who will have to instruct the local hands. Hydro-electric power will be used and, for a time, Canadian pulp, until laboratory work has shown how to use Tasmanian woods.

THE APPOINTMENT is announced of Mr. George St. J. Perrott, of North Dakota, as superintendent of the Pittsburgh Experiment Station of the United States Bureau of Mines. Mr. Perrott succeeds Mr. A. C. Fieldner, recently promoted to the post of chief engineer in the Division of Experiment Stations. The Pittsburgh station is the largest of the eleven experiment stations of the Bureau of Mines and is one of the largest research institutions in the world. As superintendent, Mr. Perrott will direct the activities of approximately two hundred scientific, technical, and other employees in the conduct of various investigations dealing with safety in mining, the elimination of waste in the mining and metallurgical industries, and the technology of fuels, gases, and explosives. Mr. Perrott, who has been a member of the staff of the Bureau of Mines for the past ten years, has established a reputation as a research specialist in the technology of explosives and in the physical properties of coal and coke.

Obituary

DR. EUGENE HAANEL, formerly director of the Canadian Department of Mines, in June, at Ottawa, aged 86.

PROFESSOR C. PULFRICH, of the Zeiss works at Jena, the eminent authority on refractometry, who was recently drowned at Baden, in Germany. He was 69 years of age.

SIR JOHN C. DAVIES, aged 63, vice chairman of Baldwins, Ltd., on Monday, at Newport, Monmouthshire. He was vice-chairman of the South Wales Siemens Steel Association, and was one of the founders of the Swansea National Shell Factory. During the war he was a member of the committee appointed by the Ministry of Munitions to control shell factories.

MR. GEORGE EDWARD WILSON, aged 67, of Park Hall, Kidderminster, for 45 years a member of the firm of Albright and Wilson, chemical manufacturers, of Oldbury. Among those present at the funeral at Churchill on August 26 was Sir Richard Threlfall, the directors of Albright and Wilson, and Mr. W. A. S. Calder, representing Chance and Hunt, Ltd., chemical manufacturers.

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The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

274,918-9. SULPHURIC ACID FROM SULPHUR DIOXIDE, MANUFACTURE OF. Sir C. W. Fielding, Billingshurst, Sussex. Application date, January 29, 1926.

274,918. It has been found that sulphuric acid can be formed directly from sulphur dioxide, oxygen, and water by contact with nitrous vitriol, which acts as a surface catalyst. The mixture of sulphur dioxide and oxygen, with or without oxides of nitrogen and water vapour, is passed through a series of tubes in which the gases come into contact with nitrous vitriol which is in circulation. Water is added to maintain the strength of the acid within the desired limits. The production of sulphuric acid is much greater than would correspond to the amount of nitrogen compounds present if these acted only as oxidising agents. The heat liberated by the reaction is absorbed by cooling.

274,919. In the process described in Specification No. 274,918 above, the nitrous vitriol contains 80-90 per cent. sulphuric acid and not less than 1 per cent. nitrous compounds. The gases are forced downwards through a number of tubes surrounded by larger tubes containing nitrous vitriol and immersed in cooling water. The vitriol and gases circulate as in an air lift, and an intimate mixture is obtained. Alternatively, the gases may be passed through fine films of nitrous vitriol supported on perforated or slotted plates, or a succession of mesh devices may be inserted in an ascending column of nitrous vitriol and gases.

274,952. HYDROGENATION OF LIQUIDS AND SEMI-LIQUIDS, APPARATUS FOR. G. R. Schueler, 3, Ash Grove, Beverley Road, Kingston-on-Hull. Application date, April 28, 1926.

A nickel catalyst for hydrogenation of liquids is in the form of gauze, or rods, or strips, or perforated discs, or of plates or helixes formed from wire, bars, or strips. These units are arranged one above another, each disc, plate, or helix having a hole through its centre so that they may be mounted on a vertical tube which is perforated for the supply of hydrogen. Oxidation of such catalysts is readily effected by suspending them between cathode plates in an electrolytic bath. The oxidation of the whole surface then takes place simultaneously, and without waste of current. Such a catalyst is also more uniform in action than nickel turnings or the like.

274,960. HYDROXYLIC COMPOUNDS, PRODUCTION OF. J. W. C. Crawford, 15, Grosvenor Gardens, London, N.W.2, and F. G. Willson, Research Department, Royal Arsenal, London, S.E.18. Application date, April 28, 1926.

The process is for the production of hydroxylic compounds from primary amines. If these are obtained by treating the primary amines with nitrous acid and allowing the products to decompose in aqueous solution, by-products are simultaneously formed by interaction between the hydroxylic compound and the undecomposed product of the reaction between nitrous acid and the amine, but it has now been found that the hydroxylic compound can be removed as it is formed by means of an inert solvent not miscible with water. The solvent may then be separated by fractional distillation or precipitation. Examples are given of the treatment of aniline to obtain phenol, *p*-toluidine to obtain *p*-cresol, *p*-chloraniline to obtain *p*-chlorphenol, *m*-aminobenzaldehyde to obtain *m*-hydroxybenzaldehyde, *m*-xylidine to obtain xylenol, anthranilic acid to obtain salicylic acid; the solvent in these cases may be xylene. The process is not applicable to some classes of hydroxylic compounds.

274,966. LEUCO-OXY-ANTHRAQUINONES, PROCESS FOR THE MANUFACTURE OF. W. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 29, 1926.

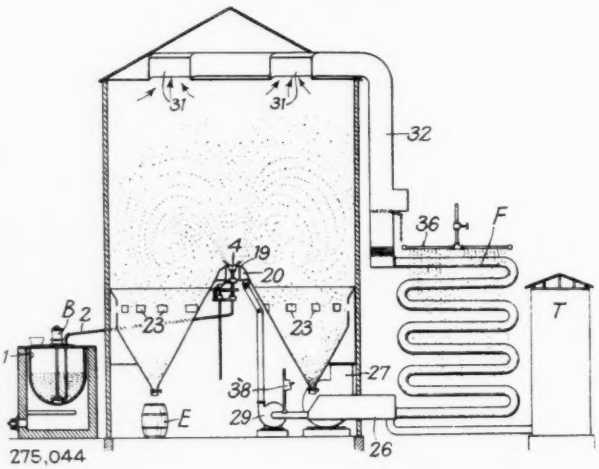
These products are obtained by heating a para-amino-oxyanthraquinone or a derivative substituted by sulpho or halogen groups in the β-position with an alkaline reducing agent such as caustic alkali and hydrosulphite until ammonia is evolved. A quantitative yield is obtained. Examples are given of the treatment of 1-amino-4-oxyanthraquinone, 1 : 5-diamino-4 : 8-dioxyanthraquinone, 1 : 4 : 5-trioxy-8-amino-anthraquinone, 1 : 5-diamino-4 : 8-dioxyanthraquinone-3 : 7-disulphonic acid, and 1-oxy-2-brom-4-amino-anthraquinone.

274,999. DYESTUFFS, MANUFACTURE OF. O. Y. Imray, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 21, 1926.

Dyestuffs containing at least two nitro groups in the molecule are obtained by causing one molecule of an aromatic nitro body having an exchangeable halogen (other than 1-halogen-2 : 4-dinitrobenzene) to act on one molecule of 4-amino-diphenylamine or a derivative or substitution product. Examples are given of the treatment of 4-nitro-4¹-amino-diphenylamine-2-sulphonic acid with 2- or 4- nitro-1-chlorbenzene, and a number of similar reactions. The products give fast yellow to brown shades on wool.

275,044. GRANULAR CAUSTIC ALKALIES, PROCESS AND APPARATUS FOR PRODUCING. R. E. Wiley and C. E. Mensing, Plainfield, Union County, N.Y., U.S.A., and Somerville, Somerset County, N.J., U.S.A. Application date, October 11, 1926.

The object is to obtain caustic soda or potash in granular form as distinguished from the fused, powdered, or flaked



form usually obtained. It is found that this granular form when exposed to moisture does not cake together as does the flaked form, but may be reduced again to the granular form by the application of slight pressure.

Caustic soda is fused in a still 1 and forced by a pump B through a pipe 2 to a sprayer 4 which consists of a small rapidly rotating cup with flared rib into which the caustic soda is delivered. The caustic soda is sprayed by means of cold compressed air issuing from the opening 19 from a circular air chamber 20. The resulting granules of solid caustic soda are received in a hopper 21 and discharged to containers E. Air is supplied to the chamber by a blower 29, and another blower 27 supplies cool dry air to ports 23 to cool the falling caustic soda. The air passes out through ports and pipe 32 to a cooling coil F over which water is sprayed from a pipe 36. The air then returns through conduit 26 to pumps 27, 29. The drying tower T packed with dehydrating material is provided for the inflow of fresh air. An inert inorganic material such as talc may be supplied through measuring device 38 to the blower 29 to mix with the caustic soda and coat the particles, and thus reduce their liability to absorb moisture.

275,116. Converting Oxides into Fused Anhydrous Chlorides, Process of. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany, and K. Staib, 14, Niemegkerstrasse, Bitterfeld, Germany. Application date, March 5, 1927.

In reactions between solid materials and gases at high temperature it is difficult to impart to the solid substances a sufficiently large surface to allow the reaction to take place with sufficient rapidity without sintering or fusing in an exothermic reaction. In the conversion of oxides of calcium, strontium, magnesium, or zinc into anhydrous fused chlorides, the finely divided oxide is suspended in a mixture of chlorine and carbon monoxide and passed into a reaction chamber preheated to about 700° C. The heat of the reaction maintains the temperature of the reaction chamber. The oxide may alternatively be mixed with carbon and the carbon monoxide omitted.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention:—246,168 (Soc. l'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude), relating to manufacture of formates, see Vol. XIV, p. 311; 248,729 (F. Pollak), relating to condensation products of urea and formaldehyde, see Vol. XIV, p. 506; 249,860 (A. F. Meyerhofer), relating to salts of complex hydrofluoric acids, see Vol. XIV, p. 551; 251,637 (I. G. Farbenindustrie Akt.-Ges.), relating to disazo dyestuffs, see Vol. XV, p. 59; 251,644 (Soc. Anon. Durand et Huguenin), relating to acid dyestuffs of the rhodamine series, see Vol. XV, p. 59; 257,907 (Canadian Electro Products Co., Ltd.), relating to lactic acid esters, see Vol. XV, p. 479; 264,143 (Canadian Electro Products Co., Ltd.), relating to hydroxy acid esters, see Vol. XVI, p. 285; 269,908 (Urbain Corporation), relating to recovery of phosphorus and hydrogenated compounds thereof as phosphoric acid, see Vol. XVII, p. 13.

International Specifications not yet Accepted

273,287. White Lead. F. T. Bailey, 72, 23rd St., Jackson Heights, and W. Austin, 138, 19th St., Jackson Heights, New York. International Convention date, June 22, 1926.

A mixture of acidulated water and powdered anhydrous lead oxide or litharge is sprayed through a current of carbon dioxide to obtain white lead. Acetic acid, ammonium acetate, nitric acid, or other acidifying agent may be used. The apparatus is described.

273,291. Phosphate Fertilisers. Rhenania-Kunheim Verein Chemische Fabriken Akt.-Ges., 10, Reichstagsurfer, Berlin. International Convention date, June 28, 1926. Addition to 235,860.

Specification 235,860 (see The Chemical Age, Vol. XIII, p. 201) describes a phosphate fertiliser containing sodium dicalcium phosphate and calcium orthosilicate obtained by heating natural phosphate, sodium sulphate or chloride, and silica with steam. In this invention, only half a molecule of silicic acid is employed to each molecule of phosphoric acid, together with sufficient silica to convert into calcium orthosilicate any lime not bound to phosphate.

273,299. Dyes. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 24, 1926. Addition to 272,924.

According to Specification 272,924 (see The Chemical Age, Vol. XVII, p. 201), 2-amino-anthrahydroquinone-9 : 10-disulphuric esters having a free 1-position are treated with alkaline oxidising agents and then with acid oxidising agents. In this invention, the same dyestuffs are obtained by a single direct treatment with acid oxidising agents, *e.g.*, ferric chloride.

273,321. Ketone-Carboxylic Acids. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 24, 1926.

Cyclic ketone-carboxylic acids are obtained by fusing hydrocarbons having free peri-positions with maleic anhydride and sodium-aluminium chloride. Examples are given of the treatment of naphthalene, acenaphthene, 1-methylnaphthalene, α-and β-naphthol, and anthracene.

273,337. Hydrogenating Oils, Coals, etc. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 26, 1926.

If solid materials are used, they are first destructively distilled, or carbonised at low temperature, and the liquids separated into fractions. Those fractions boiling between 250° C. and 350° C. are passed with hydrogen over porous charcoal, active silica, or hydrosilicates at a high temperature and at least 50 atmospheres pressure. Liquid hydrocarbons of low boiling point are obtained.

273,342. 3^1-nitro-4^1-alkylether-orthobenzoylbenzoic Acid. Newport Co. Carrolville, Wis., U.S.A. (Assignees of I. Gubelmann, 1,202, Fairview Avenue, South Milwaukee, H. J. Weiland, 1,232, Fairview Avenue, South Milwaukee, and O. Stallmann, 402, North Chicago Avenue, South Milwaukee, Wis., U.S.A. International Convention date, June 28, 1926.

A mixture of methyl alcohol and 3^1-nitro-4^1-chloro-orthobenzoyl-benzoic acid is added to caustic soda in methyl alcohol, and the mass obtained after prolonged heating is neutralised with hydrochloric acid. The alcohol is distilled off, and the methyl ether filtered off.

273,656. Dyes. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 1, 1926.

2-Halogen-benzanthrones are condensed with 1-aminoanthraquinones, and the resulting 2-benzanthronyl-1-aminoanthraquinones are treated with acid condensing agents, such as concentrated sulphuric acid and boric acid, or a mixture of aluminium and sodium chlorides. Examples are given.

273,665. Homologues of Naphthalene. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 30, 1926. Addition to 265,601. (See The Chemical Age, Vol. XVI, p. 381.)

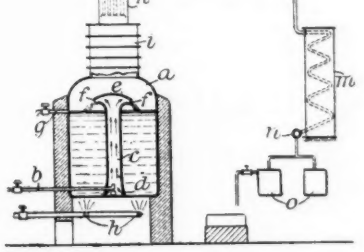
Oil gas or gas from cracking operations, containing 30 per cent. of olefines, of which 20–25 per cent. is ethylene, reacts under pressure with heated naphthalene containing 3 per cent. of aluminium chloride. A motor fuel oil is obtained, which consists of the homologues of naphthalene.

273,666. Chromates and Aluminates. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 1, 1926.

Chrome ore is heated with bauxite in the presence of alkali carbonates or caustic alkali lye, at decomposition temperature. The product is lixiviated to obtain a solution of chromates and aluminates, which may then be separated.

273,675. Distilling Tar. C. Wessel, 11, Gasstrasse, Borbeck, Essen, Germany. International Convention date, June 29, 1926.

A coal tar still is heated by burners *h*, and superheated steam is forced in through a pipe *b* and injector tube *c* covered



273,675

with a hood *e*. Lateral openings *d* are provided, to produce a circulation of the tar, and naphthalene, light oil, and water are driven off. The vapour passes through a column *i*, dephlegmator *k*, and condenser *m*, the naphthalene being received in vessels *o*.

273,684. Phenol-ketone Condensation Products. Chemische Fabrik auf Actien, vorm. E. Schering, 170, Mullerstrasse, Berlin. International Convention date, June 29, 1926.

In an example of the condensation of alkylphenols and ketones, *m*- or *p*-cresol and acetone are saturated with gaseous

hydrochloric acid, and then heated for 2 days to 30°–40° C. Excess cresol is blown off with steam, and the residue distilled in vacuo, yielding a liquid having the composition $C_{20}H_{24}O_2$.

273,685. Hydrogenation of Phenols. Chemische Fabrik auf Actien, vorm. E. Schering, 170, Mullerstrasse, Berlin. International Convention date, June 29, 1926.

Alkyl-isopropylene-phenols are obtained as described in Specification 273,686 (below) and are treated with hydrogen under pressure and at a raised temperature in presence of a catalyst to obtain alkyl-isopropyl-phenols or the corresponding cyclohexanols. Examples are given of the hydrogenation of 3-methyl-6-isopropylene-phenol to obtain thymol and menthol.

273,686. Phenols and Coumaranes. Chemische Fabrik auf Actien, vorm. E. Schering, 170, Mullerstrasse, Berlin. International Convention date, June 29, 1926.

The condensation products of alkylphenols and ketones described in 273,684 above, are heated to 280°–320° C. to depolymerise them and the products are fractionally distilled. Alkyl-isopropylene-phenols and alkylcoumaranes are obtained, and some examples are given.

273,712. Destructive Hydrogenation of Coals, Oils, etc. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, June 29, 1926.

Coal, oil, tar, or bitumen is heated with hydrogen in the presence of a catalyst which assists cracking, such as elements of the 3rd and 4th groups, copper-iron mixtures, active charcoal, hydrosilicates and silica. The products are then heated with hydrogenation catalysts such as cobalt, molybdenum, and tungsten. Thus, brown coal tar oil is heated in a current of hydrogen at 450° C. and 200 atmospheres pressure in presence of active charcoal, and the products are passed over a cobalt catalyst. The product contains 90 per cent. benzine.

Latest Notifications.

276,307. Method of storing dibasic calcium hypochlorite. I. G. Farbenindustrie Akt.-Ges. August 18, 1926.

276,313. Process for the production of alkali hydride. Deutsche Gold- and Silber-Scheideanstalt vorm. Roessler. August 23, 1926.

276,353. Manufacture of azo-dyestuffs. I. G. Farbenindustrie Akt.-Ges. August 19, 1926.

276,372. Manufacture of arylazo-diarylamines. I. G. Farbenindustrie Akt.-Ges. August 21, 1926.

Specifications Accepted with Date of Application

249,155. Liquid hydrocarbons and derivatives thereof from coal, tar, and the like, Production of. I. G. Farbenindustrie Akt.-Ges. March 14, 1925. Addition to 247,217.

251,996 and 260,940. Vat dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. May 6, and November 7, 1925. 260,940 addition to 251,996.

252,102. Metals in electric furnaces, Process for producing. E. G. T. Gustafsson. May 16, 1925.

252,182. Azo dyestuffs, Process for the manufacture of. I. G. Farbenindustrie Akt.-Ges. May 12, 1925. Addition to 229,330.

252,361. Catalytic hydrogenation of carbon oxides, Process of regeneration of contact masses for. G. Patart. May 2, 1925.

253,911. Cyclic hydrocarbons and derivatives thereof. I. G. Farbenindustrie Akt.-Ges. June 22, 1925. Addition to 251,270.

254,747. Hydrocyanic acid, Method of stabilising. Deutsche Gold- und Silber Scheideanstalt vorm. Roessler. July 3, 1925.

261,764. Cyclohexyl amines, Manufacture of. I. G. Farbenindustrie Akt.-Ges. November 19, 1925.

263,197. Carbonisation at low temperature of hydrocarb naceous material. C. Ab-der Halden. December 21, 1925.

263,794. Gas scrubber. A. C. D. Duchemin. December 31, 1925.

265,190. Lead monoxide, Process for the industrial manufacture of—by a wet method. J. J. Tardan. January 30, 1926.

265,545. Nitro-amino-benzoyl-*o*-benzoic acid, and its derivatives, Process of preparing. Newport Co. February 8, 1926.

265,563. Aluminium and its alloys, Process of purifying. Metallbank and Metallurgische Ges. Akt.-Ges. February 8, 1926.

275,724. New azine dyestuffs and new intermediate products, Manufacture of. W. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*) May 12, 1926.

275,725. Aldehyde-amine condensation products, Production of. L. Light. May 12, 1926.

275,778. Separation of materials by flotation. F. E. Elmore. July 16, 1926.

275,785. Electrolytic apparatus. W. G. Allan. August 4, 1926.

275,791. Metallising ores, Process of, and recovery of metals and by-products. D. M. Crist. August 10, 1926.

275,843. Mixed manure containing phosphoric acid and nitrogen, method of producing. F. G. Liljenroth. August 13, 1926.

275,884. Continuous treatment of hydrocarbons, Process of. O. Y. Imray. (*Allgemeine Ges. für Chemische Industrie.*) March 2, 1927.

Applications for Patents

Adam, W. G., Gas Light and Coke Co., and Potter, F. M. Distillation of oils, etc. 22,542. August 27.

Albert, A. Manufacture of arsenobenzenes. 22,463. August 26.

Appareils et Evaporateurs Kestner. Production of nitrate of lime. 22,466. August 26. (France, October 16, 1926.)

Aurig, M. Treatment of gases for removal of hydric sulphide, etc. 22,273. August 24.

Blair, E. W., Desborough, A. P. H., Reynolds, H. F., and Thomson, W. T. Mixing liquids. 22,483, 22,484. August 26.

Blair, E. W., Desborough, A. P. H., Reynolds, H. F., Thomson, W. T., and Smith, F. E. Manufacture of nitrated compounds. 22,485. August 26.

Brücklmayr, G. Treatment of gases for removal of hydric sulphide, etc. 22,273. August 24.

Burstall, F. H., and Morgan, G. T. Manufacture of metallic compounds of ethylenethiourea. 22,324. August 25.

Carpmael, A. (I. G. Farbenindustrie Akt.-Ges.). Manufacture of condensation products of benzanthrone series. 22,381. August 25.

Clark, A. S., and Washington Chemical Co., Ltd. Manufacture of magnesium carbonate. 22,383. August 25.

Coley, H. E. Reduction of ores, oxides, etc. 22,154, 22,155. August 23.

Coley, H. E. Separation of metals, etc. 22,156. August 23.

Coley, H. E. Low-temperature carbonisation of coal. 22,313. August 25.

Coley, H. E. Manufacture of zinc oxide. 22,314. August 25.

Ellinghouse, R. J. Emulsifying, etc., apparatus. 22,510. August 26.

Hands, H. J., and Spicers, Ltd. Production of cellulose ester, etc., compositions. 22,586. August 27.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of vat dyestuffs. 22,049. August 22.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Mixtures of hydrogen and carbon monoxide. 22,275. August 24.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Treatment of animal, vegetable, etc., materials. 22,276. August 24.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of fertilisers. 22,277. August 24.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of hydroxyalkylamines. 22,278. August 24.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Recovery of metals, etc., soluble in ammoniacal liquors. 22,279. August 24.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Leaching metals, etc., soluble in ammonia. 22,280. August 24.

I. G. Farbenindustrie Akt.-Ges. Manufacture of condensation products of benzanthrone series. 22,381. August 25.

I. G. Farbenindustrie Akt.-Ges. Manufacture of hollow articles of quartz, etc. 22,514. August 26.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of raw rubber from rubber latex. 22,595. August 27.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Process for production of ethylene. 22,596. August 27.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Process for cultivating micro-organisms. 22,597. August 27.

I. G. Farbenindustrie Akt.-Ges. Manufacture of arylazo-diarylamines. 22,087. August 22. (Germany, August 21, 1926.)

I. G. Farbenindustrie Akt.-Ges. Providing photographic raw film with visible reproducible inscriptions. 22,268. August 24. (Germany, March 16.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of viscose silk. 22,362. August 25. (Germany, August 25, 1926.)

I. G. Farbenindustrie Akt.-Ges. Process for opening-up materials containing cellulose. 22,461. August 26. (Germany, October 13, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of dyestuffs. 22,462. August 26. (Germany, October 21, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of monobenzoyldiamino anthraquinones. 22,515. August 26. (Germany, August 30, 1926.)

I. G. Farbenindustrie Akt.-Ges. Scavenging combustion products in internal-combustion engines. 22,593. August 27.

I. G. Farbenindustrie Akt.-Ges. Manufacture of condensation products of urea. 22,594. August 27.

Imperial Chemical Industries, Ltd., and Jenkins, W. J. Solvents for nitrocellulose. 22,482. August 26.

Imperial Chemical Industries, Ltd. Nitrocellulose solutions. 22,481. August 26.

Sharp, A., and Soc. Générale Métallurgique de Hoboken. Manufacture of sulphuric acid. 22,159. August 23.

Soc. of Chemical Industry in Basle. Manufacture of gold-nucleic-acid compounds. 22,360. August 25. (Switzerland, August 25, 1926.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton for home market, 1-cwt. drums included.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—8d. to 9d. per lb. Crude 60's, 2s. 4½d. to 2s. 8d. per gall.

ACID CRESYLIC 99/100.—2s. 9d. to 2s. 10d. per gall. 97/99.—2s. 1½d. to 2s. 5d. per gall. Pale, 95%, 2s. to 2s. 3d. per gall. Dark, 1s. 9d. to 2s. 2d. per gall.

ANTHRACENE.—A quality, 2½d. to 3d. per unit. 40%, 3d. per unit.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.; both according to gravity.

BENZOLE.—Crude 65's, 10d. to 10½d. per gall., ex works in tank wagons. Standard Motor, 1s. 3d. to 1s. 3½d. per gall., ex works in tank wagons. Pure, 1s. 6d. to 1s. 7d. per gall., ex works in tank wagons.

TOLUOLE.—90%, 1s. 4d. to 1s. 9d. per gall. Firm. Pure, 1s. 7d. to 2s. per gall.

XYLOL.—1s. 3d. to 1s. 10d. per gall. Pure, 2s. 5d. per gall.

CREOSOTE.—Cresylic, 20/24%, 10d. to 11d. per gall.; middle oil, 9d. to 10d. per gall. Heavy, 8½d. to 8¾d. per gall. Standard specification, 7¾d. to 7½d. Salty, 7d. per gall. less 1½%.

NAPHTHA.—Crude, 7½d. to 8d. per gall. according to quality. Solvent 90/160, Country, 10½d. to 11d. per gall.; London, 1s. 2d. to 1s. 4d. per gall. Solvent 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, Country, 10d. to 11d. per gall.; London, 1s. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £7 10s. per ton. Whizzed or hot pressed, £8 10s. to £9 per ton.

NAPHTHALENE.—Crystals, £11 10s. to £13 10s. per ton. Quiet. Flaked, £12 10s. to £13 per ton, according to districts.

PITCH.—Medium soft, 90s. to 95s. per ton, f.o.b., according to district.

PYRIDINE.—90/140, 5s. 9d. to 7s. per gall. 90/180, 4s. 6d. to 5s. per gall. Heavy, 4s. to 4s. 6d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—4s. 9d. per lb.

ACID H.—3s. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—7½d. per lb. naked at works.

ANILINE SALTS.—7½d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—4½d. per lb. Fair inquiry.

m-CRESOL 98/100%.—2s. 7½d. per lb. Only limited inquiry.

p-CRESOL 32/34° C.—2s. 8¾d. per lb. Only limited inquiry.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—11d. to 1s. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.

B-NAPHTHYLAMINE.—3s. per lb. d/d.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb. d/d.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb. d/d.

R. SALT.—2s. 2d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—7½d. per lb. naked at works.

p-TOLUIDINE.—2s. 2d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

N. W. Acid.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 to £9 5s. per ton. Grey, £15 per ton.

CHARCOAL.—£6 to £9 per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

LIQUOR.—9d. to 10d. per gall. 16° Tw.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—4s. to 4s. 1d. per gall., 60% O.P. Solvent, 4s. 3d. per gall., 40% O.P.

WOOD TAR.—£4 10s. to £5 per ton and upwards, according to grade.

BROWN SUGAR OF LEAD.—£40 15s. per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 5½d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 6d. to 2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 1d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. to 6s. 3d. per lb.

ZINC SULPHIDE.—1s. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 5d. per lb.

ACID, BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. to 1s. 3d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 40s. to 43s. per cwt.; powder, 44s. to 47s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 6¾d. to 1s. 7¾d per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.
ACID, SALICYLIC, B.P.—1s. 3d. to 1s. 3½d. per lb.; Technical.—11½d. to 1s. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 3¾d. per lb., less 5%. Firm market.
AMIDOL.—9s. per lb., d/d.
ACETANILIDE.—1s. 6d. to 1s. 8d. per lb. for quantities.
AMIDOPYRIN.—8s 6d. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: 1s. per lb.
ATROPINE SULPHATE.—11s. per oz. for English make.
BARBITONE.—6s. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. to 10s. per lb.
BISMUTH CITRATE.—9s. 6d. to 9s. 9d. per lb.
BISMUTH SALICYLATE.—8s. 9d. to 9s. per lb.
BISMUTH SUBNITRATE.—7s. 9d. to 8s. per lb.
BISMUTH NITRATE.—5s. 9d. to 6s. per lb.
BISMUTH OXIDE.—13s. 9d. to 14s. per lb.
BISMUTH SUBCHLORIDE.—11s. 9d. to 12s. per lb.
BISMUTH SUBGALLATE.—7s. 9d. to 8s. per lb. Extra and reduced prices for smaller and larger quantities respectively; Liquor Bismuthi B.P. in W. Qts. 1s. 1d. per lb.; 12 W. Qts. 1s. per lb.; 36 W. Qts. 11½d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 26s. to 29s. per cwt. according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Potassium, 1s. 9½d. to 1s. 10½d. per lb.; sodium, 2s. to 2s. 1d. per lb.; ammonium, 2s. 2d. to 2s. 3d. per lb.; granulated ½d. per lb. less; all spot
CALCIUM LACTATE.—1s. 2d. to 1s. 3d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. 1d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 6d. per lb., duty paid.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—Prices for Winchester quarts; dozen Winchester quarts; carboys or drums; and 10 cwt. lots respectively: ·730—1s. 2½d.; 1s. 2d.; 1s. 1½d.; 1s. 0½d.; ·720 technical—1s. 5½d.; 1s. 5d.; 1s. 4½d.; 1s. 3½d.; ·720 pur. (Aether B.P., 1914)—2s. 4d.; 2s. 3½d.; 2s. 3d.; 2s. 2d.
FORMALDEHYDE.—£39 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—5s. per lb.
HEXAMINE.—2s. 4d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., bulk, 2s. to 2s. 3d. per gal. Winchesters, 2s. 11d. to 3s. 9d. per gal.; 20 vols., bulk, 4s. to 4s. 3d. per gal.; Winchesters, 5s. to 6s. 6d. per gal.
HYDROQUINONE.—2s. 11d. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE.—B.P., 2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.
IRON PERCHLORIDE.—4d. per lb., 22s. per cwt.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy Commercial, £[illegible] per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. [illegible]d. per lb., in 1 cwt. lots.
MENTHOL.—A.B.R. recrystallised B.P., 18s. 6d. per lb. net; Synthetic detached crystals, 9s. to 12s. 9d. per lb., according to quantity; Liquid (95%), 11s. 3d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, 7s. 6d. to 7s. 7d. per lb., levig., 7s. to 7s. 1d. per lb.; Corrosive Sublimate, Lump, 5s. 9d. to 5s. 10d. per lb., Powder, 5s. 2d. to 5s. 3d. per lb.; White Precipitate, Lump, 5s. 11d. to 6s. per lb., Powder, 6s. to 6s. 1d. per lb., Extra Fine, 6s. 1d. to 6s. 2d. per lb.; Calomel, 6s 4d. to 6s. 5d. per lb.; Yellow Oxide, 6s. 10d. to 6s. 11d. per lb.; Persulph., B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 5s. 10d. to 5s. 11d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 9d. per lb.
METHYL SULPHONAL.—9s. 6d. to 9s. 9d. per lb.
METOL.—11s. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 9d. to 3s. per lb.
PHENAZONE.—4s. 3d. to 4s. 6d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—100s. per cwt. less 2½% for ton lots.
POTASSIUM CITRATE.—B.P.C., 1911: 1s. 8d. to 1s. 11d. per lb.; U.S.P.: 1s. 11d. to 2s. 2d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb. in cwt lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb. according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 6d. per lb., spot.
QUININE SULPHATE.—2s. per oz., 1s. 8d. to 1s. 9d. for 1000 oz. lots in 100 oz. tins.
RESORCIN.—3s. 9d. to 4s. per lb., spot.
SACCHARIN.—55s. per lb.; in quantity lower.
SALOL.—2s. 4d. per lb.
SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923—2s. to 2s. 1d. per lb. for 1 cwt. lots. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—90s. to 95s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 8½d. to 1s. 9½d. per lb. Crystal, 1s. 9½d. to 1s. 10½d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
SULPHONAL.—6s. 6d. to 6s. 9d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 2d. per lb.
THYMOL.—Puriss., 10s. to 10s. 3d. per lb., according to quantity. Firmer. Natural, 15s. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.
AUBEPINE (EX ANETHOL), 10s. 6d. per lb
AMYL ACETATE.—2s. per lb.
AMYL BUTYRATE.—5s. 3d. per lb.
AMYL SALICYLATE.—3s. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—17s. per lb.
COUMARIN.—10s. per lb.
CITRONELLOL.—13s. 9d. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—8s. 6d. per lb.
GERANIOL (PALMAROSA).—18s. 6d. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—4s. 9d. per lb.
ISO EUGENOL.—13s. 6d. per lb.
LINALOL.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 10s. 6d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 18s. 6d. per lb. Ex Shui Oil, 14s. 6d. per lb.
METHYL ANTHRANILATE.—8s. 6d. per lb
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—35s. per lb.
MUSK XYLOL.—8s. per lb.
NEROLIN.—4s. 6d. per lb.
PHENYL ETHYL ACETATE.—12s. per lb.
PHENYL ETHYL ALCOHOL.—10s. 6d. per lb.
RHODINOL.—32s. 6d. per lb.
SAFROL.—1s. 6d. per lb.
TERPINEOL.—1s. 8d. per lb.
VANILLIN.—18s. per lb.

Essential Oils

ALMOND OIL.—11s. per lb.
ANISE OIL.—3s. per lb.
BERGAMOT OIL.—28s. per lb.
BOURBON GERANIUM OIL.—14s. 6d. per lb.
CAMPHOR OIL.—75s. per cwt.
CANANGA OIL, JAVA.—26s. per lb.
CINNAMON OIL LEAF.—6d. per oz.
CASSIA OIL, 80/85%.—7s. 6d. per lb.
CITRONELLA OIL.—Java, 85/90%, 1s. 11d. per lb. Ceylon, pure, 1s. 9d. per lb.
CLOVE OIL.—6s. per lb.
EUCALYPTUS OIL, 75/80 %.—2s. 3d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, Esters, 20s. per lb.
LEMON OIL.—8s. per lb.
LEMONGRASS OIL.—4s. 6d. per lb.
ORANGE OIL, SWEET.—11s. 3d. per lb.
OTTO OF ROSE OIL.—Anatolian, 30s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—10s. 6d. per lb.
PEPPERMINT OIL.—Wayne County, 17s. 6d. per lb.; Japanese, 8s. 3d. per lb.
PETITGRAIN OIL.—7s. 9d. per lb.
SANDALWOOD OIL.—Mysore, 26s. 6d. per lb.; 90/95%, 16s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, September 1, 1927.

THERE has been a better volume of business during the last week, and things seem to be settling down after the holidays. Price changes are mostly in an upward direction. Export inquiry is a little more lively.

General Chemicals

ACETONE passes steadily into consumption; price unchanged at £62 per ton, with reductions for quantities.

ACID ACETIC is quietly steady at £37 to £38 per ton for 80% grade.

ACID FORMIC is in fair demand; price unchanged at £47 per ton for 85%.

ACID LACTIC is unchanged.

ACID OXALIC is in slow demand; price very firm at about £30 per ton.

ALUMINA SULPHATE is in good inquiry on both home trade and export account; price about £5 10s. for 17-18%.

ARSENIC is without special feature.

BARIUM CHLORIDE is in fair demand; price £8 to £8 10s. per ton, ex warehouse.

COPPER SULPHATE is unchanged.

EPSOM SALTS are in good inquiry, although the price still shows a tendency to be easier.

FORMALDEHYDE is in good demand and stocks are short; price firm at £41 per ton.

LEAD ACETATE is in good demand for spot delivery; white is quoted £43 to £44 per ton, and brown £42 to £43 per ton.

LEAD NITRATE.—Unchanged.

LIME ACETATE.—Unchanged.

METHYL ALCOHOL remains firm at £55 to £62 per ton, according to grade.

POTASSIUM CHLORATE is quiet; price firm at £25 per ton.

POTASSIUM PERMANGANATE.—The advance in price has been maintained and the price varies from 8¼d. to 8½d. per lb.

POTASSIUM PRUSSIATE is quiet at £60 to £62 per ton.

SODA ACETATE is in active demand on export account; price firm at £19 per ton.

SODA BICHROMATE.—Unchanged.

SODA CHLORATE is in fair demand; price firm at £25 to £26 per ton.

SODA HYPOSULPHITE.—Unchanged.

SODA NITRITE is in good inquiry; price unchanged at £19 10s. to £20 per ton.

SODA PHOSPHATE.—Unchanged.

SODA PRUSSIATE is quietly steady at 4¾d. per lb.

SODA SULPHIDE.—Unchanged.

ZINC SULPHATE.—Unchanged.

Coal Tar Products

There is no great change to report in the market values of coal tar products since last week.

90's BENZOL remains weak, and is quoted at 1s. 4d. to 1s. 5d. per gallon on rails, while the motor quality is quoted at 1s. 1½d. to 1s. 2½d. per gallon.

PURE BENZOL is quoted at 1s. 7½d. to 1s. 8½d. per gallon on rails.

CREOSOTE OIL is very firm, the price in the north being 7½d. per gallon on rails, while the price in London is about 8¼d. per gallon.

CRESYLIC ACID is weaker, and larger quantities are now offering. The pale quality 97/99% is quoted at 2s. 2d. per gallon ex works, while the dark quality 95/97% is worth about 1s. 11d. per gallon.

SOLVENT NAPHTHA is weak, and can be bought at about 10d. per gallon on rails.

HEAVY NAPHTHA is unchanged, at about 11d. per gallon on rails.

NAPHTHALENE.—There is slightly more offering, but prices are steady at about £6 15s. to £7 per ton for the 74/76 quality, and about £8 to £8 15s. per ton for the 76/78 quality.

PITCH is in better demand, and the market is firm; to-day's value is about 90s. f.o.b. U.K. ports.

Nitrogen Products

Export.—During the past week the demand for sulphate of ammonia has continued active and the price remains unchanged at £9 5s. 6d. to £9 8s. per ton, f.o.b. U.K. port in single bags. It has been reported that the continental demand continues to be very satisfactory. The German consumption has shown definite signs of increase. This is probably due to the increase in consumption of the material per hectare. It is well known that the consumption in Germany is less than half that of Holland and Belgium per hectare. Apart from this, the Far East and the West Indies continue to be purchasers.

Home.—The home market continues dull and uninteresting. It is not expected that demand will become heavy until the end of the year.

Nitrate of Soda.—A few sales of nitrate have been reported during the last week. Producers still offer on the basis of 16s. 3d. per metric quintal, f.a.s. Chile. It is not expected that the larger merchants will cover their spring requirements until later in the year, as the autumn requirements are covered by the heavy purchases made in the earlier summer months.

Synthetic Menthol Prices

IT is announced that Howards' synthetic menthol has just been very considerably reduced in price. The low price of the natural menthol has for some time rather overshadowed the synthetic product, but the wider margin now obtaining may, it is thought, result in a greatly increased volume of business for synthetic menthol. This reduction in price is made possible by improved methods of manufacture. An inquiry by post card to Howards and Sons, Ltd., Ilford, will bring all the necessary information as to prices, etc.

New Price List

TOWNSON AND MERCER, LTD., of 34, Camomile Street, London, have issued, under date August, 1927, a revised and reduced net price list of pure chemicals for analytical, photographic, educational, technical, and other purposes. The list includes pure chemicals; guaranteed reagents for analysis; radioactive minerals; pure standard solutions for volumetric analysis (which are available in large variety); indicators; and a number of other products.

Perchloride of Iron

F. S. BAYLEY, CLANAHAN AND CO., Manchester, announce a new make of hydrated crystals ($FeCl_3$, $6H_2O$), for which the quotation, without engagement, is: In 190 kilo barrels, £14 10s.; in 40 kilo kegs, £16; per ton c.i.f. U.K. ports, in minimum 2-ton lots, to arrive.

Calcium Cyanamide 19 per cent.

A STEADY demand continues and buyers are advised to take advantage of September delivery, the farmers' price for 4-ton lots being £8 8s. per ton, carriage paid to any railway station in Great Britain.

Asbestos and Allied Products in Canada, 1926

ACCORDING to a statement just issued by the Dominion Bureau of Statistics at Ottawa, manufactures of asbestos and allied products in Canada during 1926 amounted in value to $1,530,094. This was an increase of 14 per cent. over the sales value of production in 1925, which in turn was 128 per cent. over 1924, due largely to the returns received from new plants in Quebec. Fourteen plants reported to the Bureau in 1926 as against twelve in the previous year; returns were received from two new plants in British Columbia, one in Manitoba, and one in Ontario, while one concern in the latter province went out of business and another was reclassified as belonging to a different group. The operating plants in 1926 were distributed as follows: one in Nova Scotia, four in Quebec, five in Ontario, one in Manitoba, and three in British Columbia. Capital employed was given at $2,773,433; the average number of employees was 270; payments for salaries and wages totalled $321,865, and raw materials cost $750,907. Since the selling value of products was $1,530,094, the value added by manufacturing was $779,187, or 104 per cent. of the original cost. Products of this industry included boiler and pipe coverings, linings, packing, lumber, paper and shingles of asbestos and such other lines as magnesite flooring, stucco, etc. During the year imports of asbestos products into Canada were valued at $565,635, and exports, including mine shipments of crude and fibre, were valued at $10,705,301, but of this latter total only $43,011 represented manufactured asbestos products.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, August 31, 1927.

BUSINESS in the heavy chemical market has been rather brighter during the past week with fair inquiry both for home and export. Prices remain steady with the exception of arsenic, which is again scarce for prompt delivery, and consequently dearer.

Industrial Chemicals

ACID ACETIC.—98/100%, £65 to £67 per ton, according to quality and packing c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystal, granulated or small flakes, £34 per ton. Powder, £36 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Rather better demand. Quoted price unchanged at 8d. per lb., f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Now on offer at 1s. 6d. to 1s. 6¼d. per lb., less 5%, ex store. Continental still high at about 1s. 7d. per lb., less 5%, ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC, 80%.—Quoted £23 5s. per ton, ex station, full truck loads.

ACID OXALIC.—Rather dearer quotation from the Continent. Now quoted 3d. per lb., ex wharf, spot material available in limited supply at the same figure.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—In little demand and quoted price now 1s. 3d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot material quoted £5 12s. 6d. per ton, ex store. On offer for early delivery at £5 5s. per ton c.i.f. U.K. ports.

ALUM POTASH.—Lump quality quoted £8 5s. per ton, c.i.f. U.K. ports. Crystal meal, 10s. per ton less. Lump quality on spot offered at £9 per ton, ex store.

AMMONIA, ANHYDROUS.—Unchanged at about 9d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture unchanged at £23 to £24 per ton, ex station. Continental on offer at about £19 10s. per ton, c.i.f. U.K. ports. Fine white crystals of continental manufacture now quoted £17 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Scarce for prompt delivery and price advanced to about £19 10s. per ton, ex wharf. Spot material quoted £20 5s. per ton, ex store.

BARIUM CARBONATE, 98/100%.—Continental material unchanged at about £7 10s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £6 17s. 6d. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers, £8 per ton, ex station, minimum 4-ton lots. Spot material, 10s. per ton extra. Continental on offer at £7 5s. per ton, ex wharf.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 to £5 5s. per ton, ex store, with a slight reduction for contracts. Continental quoted £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports for export.

COPPER SULPHATE.—Continental material now quoted £23 15s. per ton, ex wharf. British material on offer at £23 10s. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Unchanged at £38 per ton, c.i.f. U.K. ports. Spot material quoted £39 5s. per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material quoted £30 per ton, ex store.

LEAD, WHITE.—Quoted £31 per ton, ex store.

LEAD ACETATE.—White crystals now on offer from the Continent at £40 per ton, c.i.f. U.K. ports; brown, about £38 15s. per ton, c.i.f. U.K. ports. Spot material on offer at £43 5s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

POTASH CAUSTIC.—88/92%, solid quality, quoted £28 15s. per ton, c.i.f. U.K. ports, minimum 15-ton lots. Under 15-ton lots, £29 10s. per ton. Liquid, £15 per ton, minimum 15-ton lots. Under 15-ton lots, £15 7s. 6d. per ton, c.i.f. U.K. ports.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Unchanged at £27 5s. per ton, ex wharf, prompt shipment. Spot material quoted £28 10s. per ton, ex store. 80/85%, calcined quality, on offer at £20 10s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE.—Powdered quality quoted £22 10s. per ton, c.i.f. U.K. ports. Crystal, 30s. per ton extra.

POTASSIUM NITRATE.—Unchanged at £20 7s. 6d. per ton, c.i.f. U.K. ports. Spot material quoted £21 5s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 6½d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—Rather easier and now quoted 6⅝d. per lb., ex store. Rather cheaper quotations for prompt shipment from the Continent.

SODA CAUSTIC.—Powdered, 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton; 70/72%, £14 10s. per ton, carriage paid station. Minimum 4-ton lots on contract. Spot material, 10s. per ton extra.

SODIUM ACETATE.—English material now quoted £21 per ton, ex store. Continental on offer at £17 5s. per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¼d. per lb., delivered buyers, works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton; alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 10s. per ton, ex store. Minimum 4-ton lots. Continental on offer at about £8 2s. 6d. per ton, ex wharf, prompt shipment. Pea crystals of British manufacture quoted £15 5s. per ton, ex station, 4-ton lots.

SODIUM NITRITE, 100%.—Quoted £19 10s. per ton, ex store.

SODIUM PRUSSIATE (YELLOW).—In moderate demand and price unchanged at about 4¼d. per lb., ex store. Offered for prompt shipment from the Continent at 4¼d. per lb., ex wharf.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 7s. 6d. per ton, ex works.

SODIUM SULPHIDE.—Prices for English material as follows: 60/62, solid, now £10 10s. per ton; broken, £11 10s. per ton; flake, £13 5s. per ton; crystals, 31/34%, £7 10s. per ton to £8 5s. per ton according to quality, delivered your works, minimum 4-ton lots on contract. Prices for spot delivery 5s. per ton higher for solid, 2s. 6d. per ton for crystals. Offered from the Continent at about £9 5s. per ton, c.i.f. U.K. ports; broken, 15s. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £11 per ton; rock, £11 per ton; floristella, £10 per ton; ground American, £9 5s. per ton, ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered, 20s. per ton extra.

ZINC SULPHATE.—Continental material now quoted £11 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Canadian Arsenic Production

FINALLY revised statistics on the production of arsenic from Canadian ores in 1926, as reported by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa, show an output of 5,074,677 pounds valued at $146,811 in 1926 as compared with 3,434,137 lbs., valued at $130,302 in 1925. Arsenic is consumed in large quantities in the manufacture of calcium arsenate, an insecticide which is most effective in combating the ravages of the boll weevil, an insect which infests the cotton plant of the south, and the degree of infestation of this crop has a direct bearing on the price and production of arsenic. The average price of arsenic in New York during 1926 was 3·5 cents per lb., as against 4·66 cents in 1925. In Canada arsenic is used in the manufacture of Paris green, lead arsenate, lime arsenate, sheep dips and other insecticides. The greater part of the Canadian production of arsenic is obtained from the South Ontario smelters.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, September 1, 1927.

The turn of the month has been welcomed by the Manchester chemical market, for it signifies the virtual close of the holiday season, and, if it is to come, the closer approach of the autumn trade improvement which the chemical market here hopes to share. There is no sign of this yet, it must be confessed, for there is a still too prevalent tendency among home trade consumers to restrict their commitments to near deliveries and to limit the size of their orders. Buying for shipment is also on a relatively small scale.

Heavy Chemicals

Caustic soda is a fairly active section both for home use and for export, with values for the former quite firm at from £14 10s. to £16 10s. per ton, according to strength. In the case of sulphide of soda, however, conditions are the reverse, demand being slow and prices easy, with 60–65 per cent. concentrated solid quoted at from £10 10s. to £11 per ton and the commercial quality at about £8 10s. Phosphate of soda keeps up well at between £12 10s. and £12 15s. per ton, and a moderate trade in this is reported this week. Neither saltcake nor glauber salts are attracting much interest just now, and the tendency in each case is easy at £3 12s. 6d. and £3 5s. per ton, respectively. Chlorate of potash, also, is lacking in strength, and a limited business has been put through at round 2⅞d. per lb. Alkali continues firm and is moving off in fair quantities at £6 15s. per ton. There has been little change in hyposulphite of soda so far as prices are concerned, but trade is quiet; photographic crystals are quoted at £16 10s. per ton and commercial material at about £9 15s. Bicarbonate of soda is maintained at £10 10s. per ton, and a fair amount of business in this continues to be done. Prussiate of soda is rather slow, and current offers of this vary from 4⅛d. to 4¼d. per lb. Nitrite of soda is being offered at £19 2s. 6d. per ton, but there is only a quiet trade passing in this. Bichromate of soda is steady and in moderate request at round 3d. per lb.

Carbonate of potash is attracting a moderate amount of attention at steady prices, from £27 to £27 5s. per ton being asked here. Caustic potash, also, is in fairly active demand and values keep firm at round £31 per ton. Chlorate of potash is in slow request and quotations are easy at 2⅞d. to 3d. per lb. Nothing much is stirring in the case of permanganate of potash and the tendency is easy although not quotably changed since last week; commercial grade is on offer at about 5d. per lb. and B.P. at 6½d. A quiet trade in bichromate of potash is being done, with current offers of this material at from 4d. to 4⅛d. per lb. No improvement in the demand for yellow prussiate of potash can be reported, but at about 6⅝d. per lb. prices show little further change.

Arsenic continues to display firmness and the increased interest recently shown in this product has been maintained; white powdered Cornish makes, are quoted at from £17 10s. to £17 15s. per ton, at the mines. Sulphate of copper remains fairly steady and meets with a moderate demand at about £25 5s. per ton. For nitrate of lead inquiry is rather limited, but prices are unchanged at £38 per ton. The acetates of lead are quiet, but values are maintained at £42 for white and £40 for brown. Continued short supplies of acetate of lime have the effect of keeping quotations up, and the brown quality is firmer at from £8 10s. to £9 per ton, with grey material still quoted at £15 10s.

Acids and Tar Products

There is not a great deal of buying interest just now in either citric or tartaric acid, and the tone is rather less strong than it has been recently, with citric at about 1s. 6¾d. per lb. and tartaric at 1s. 3d. Oxalic acid is in quiet demand, with offers at round 3⅛d. per lb. Acetic acid meets with a moderate amount of inquiry at £66 to £67 per ton for glacial and £37 for the 80 per cent. commercial.

Pitch is well held at round £4 10s. per ton, and a fair amount of interest is being taken in this section of the market. Creosote oil is also very firm at about 7½d. per gallon. Solvent naphtha, however, is slow and weak at 1s. per gallon, or slightly below this figure. Crude carbolic acid is on the short side at 2s. 6d. per gallon, whilst crystals are quiet at up to 8d. per lb.

Dead Sea Salts Concession

American Report Declared to be "Quite Untrue"

Chemical Markets (New York) states definitely that "Imperial Chemical Industries, Ltd., is to exploit the mineral resources of the Dead Sea," and adds: "The concession is said not to grant an unrestricted monopoly, but to provide that the bulk of surplus profits will go to the Government of Palestine, partly for reinvestment in Palestinian industry. Another provision is said to be the distribution of fertiliser to the farmers of Palestine and Transjordania at cost prices."

On inquiry, as going to press, at the Colonial Office, London, we were informed that this report is "quite untrue."

Syllabus of the Sir John Cass Technical Institute

The 1927–28 syllabus of classes of the Sir John Cass Technical Institute, Jewry Street, London, E.C., is now available, and contains full details of courses at the Institute. Classes are arranged to meet the requirements of students preparing for the B.Sc. degree of London University in Experimental Science and also for the degree of B.Sc. (Metallurgy). The Institute is a recognised institution for the training of candidates for the examinations of the Institute of Chemistry, and a three years' curriculum meets with the requirements of students wishing to qualify for the Part-time Course Certificate in Chemistry, awarded by the Institute of Chemistry in conjunction with the Board of Education.

The courses of lectures and laboratory work are arranged to meet the requirements of those engaged in chemical industries, or in trades associated with chemical products. A special section is devoted to the Fermentation industries, and full details are given of classes and lectures in various branches of chemical industry, metallurgy, petroleum technology, and in many subjects other than chemistry.

Cambridge Instruments at Engineering Exhibition

A representative collection of instruments for ships and engineering works will be shown by the Cambridge Instrument Co., Ltd., at the Shipping, Engineering and Machinery Exhibition at Olympia, London, W., from September 8–24. A feature of the exhibit will be a complete installation of six illuminated dial CO_2 indicators shown in actual operation, working in conjunction with a CO_2 recorder. These indicators possess many features which enable the stoker to see at a glance the results he is obtaining. To ensure added robustness to the indicator the galvanometer for the Wheatstone bridge circuit forms a separate unit, which may be placed at a distant from the boiler plant.

A new dissolved oxygen recorder which will be shown is a strong instrument which records the percentage of oxygen in boiler feed water, thus checking the working of de-aerators and enabling the corrosion of boiler tubes to be reduced to a minimum. Other instruments include various kinds of temperature measuring and recording instruments.

United States Exports of Ammonium Sulphate

Formerly an extensive importer of ammonium sulphate the United States now accords this commodity, obtained as a by-product of coke and gas manufacture, the first place in its list of manufactured chemical items exported, notwithstanding that nitrogen, in the form of Chilean nitrate, occupies the same position in the chemical import trade. The value of the 1926 exports of ammonium sulphate reached $9,800,000, corresponding to about one-fifth that of sodium nitrate imports. The weight of ammonium sulphate exported was 181,125 long tons in 1926, as against 123,141 long tons in 1925. Asiatic markets consume the bulk of the exports. Whereas in 1925 almost 90 per cent. was destined to Asia, only 82·9 per cent. of the 1926 exportation was sent to that continent, owing to sizable shipments to Spain, the Irish Free State, and British African countries. In the face of keen competition American sulphate was exported to 33 countries last year. In connection with the increase of exports in 1926 over 1925 the coal strike in Great Britain must be kept in mind.

Company News

SHAWINIGAN WATER AND POWER.—A dividend of 50 cents has been declared on the common shares for the quarter ended September 30.

HEPPELLS, LTD.—The profit for the 23 months to March 31 last amounted to £20,805, against £21,587 for the previous period of 14½ months to April 30, 1925.

STAVELEY COAL AND IRON CO.—A final dividend of 1s. per share is announced on the fully-paid shares, and of 9d. per share on the partly-paid, making 7½ per cent. for the year, free of tax.

ELLIOTT'S METAL CO., LTD.—After paying debenture interest the profits for the year ended July 30, 1927, amount to £57,162, to which must be added £54,266, being the balance standing to the credit of profit and loss account, making a total of £111,428. The directors propose to pay a dividend at the rate of 2s. per share on the ordinary shares, subject to deduction of income tax, carrying forward £55,869. The annual meeting will be held at Birmingham on September 26, at 12.15 p.m.

F. STEINER AND CO.—The full report for the year ended July 31, 1927, states that after charging £53,746 for repairs and depreciation of machinery, the loss is £28,854. The balance of profit and loss brought forward is £30,113, and the directors have transferred from revenue reserve £70,000, making a total of £100,113. After making payment of twelve months' interest on mortgage debenture stock and dividend on preference shares, and deducting loss for year, the balance at the credit of profit and loss account is £30,759, which the directors recommend be carried forward. The annual meeting will be held at Church, on September 7, at 12.15 p.m.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

TIN, LEAD, AND ANTIMONY.—Tenders are invited by the Direction of State Railways, Prague-South, to be presented by September 8, 1927, for the supply of 10,000 kg. of original English tin, 20,000 kg. soft Pribram lead, or other lead, and 4,000 kg. of pure antimony. British firms in a position to offer British material can obtain further particulars on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. (Ref. A.X. 5122.)

CHROMIUM, MANGANESE, TUNGSTEN, BISMUTH, IRON, AND TITANIUM ORES.—A firm in Hamburg desire to represent, on a commission basis for the whole of Germany, a British firm dealing in the above. (Ref. No. 184.)

ARTIFICIAL RESIN, CASEIN, AND NON-INFLAMMABLE CELLULOID.—An agent in Vienna desires to secure the representation, on a commission basis, of British manufacturers of the above goods. (Ref. No. 178.)

Tariff Changes

CZECHOSLOVAKIA.—In virtue of an order effective from July 1 the Customs duty on sulphate of ammonia is to be payable at the reduced rate of 21·60 Czechoslovak kronen per 100 kg. until December 31.

FRANCE.—Information as to some recent decisions of the French Customs Department with regard to the classification of various articles under the French Customs Tariff are obtainable from the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. The list of articles, which includes alloys of nickel and copper, hydrochlorate of ammonia containing impurities, is contained in the *Board of Trade Journal* for August 25, 1927.

ITALY.—A decree of June 23 adds raw celluloid to the list of goods which may be imported into Italy duty free under the temporary importation scheme.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to September 17, 1927.

480,974. Class 1. Dyes. Fairy Dyes, Ltd., 61, Well Road, Glasgow, Scotland; dye manufacturers. May 25, 1927. (To be associated, Sect. 24.)

481,499. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. W. S. Merrikin, Ltd., Greenland Works, Bankside, Sculcoates, Kingston-upon-Hull; paint, colour, and varnish, manufacturers. June 13, 1927. (To be associated, Sect. 24.)

Opposition to the Registration of the following Trade Marks can be lodged up to September 24, 1927.

"PEMCO."

475,914. Class 1. Paints, enamels and varnishes. The Porcelain Enamel and Manufacturing Company (a company duly incorporated under the laws of America), 410, Eastern Avenue, Baltimore, Maryland, United States of America; manufacturers of enamels and enamelling equipment; exporters and importers. December 14, 1926. (By consent.) Address for Service in the United Kingdom is: c/o The Incandescent Heat Co., Limited, British Mills, Cornwall Road, Smethwick, Birmingham.

"COLINDUS."

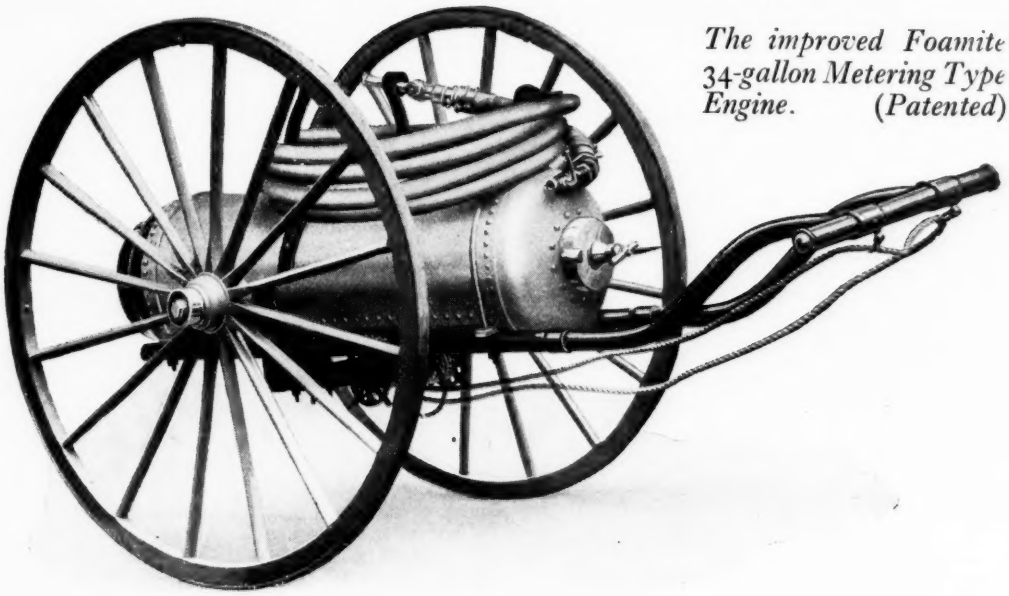
482,180. Class 4. Raw, or partly prepared, vegetable, animal and mineral substances used in manufactures, not included in other classes. Industrial Products, Ltd., 17, Herschell Street, Anniesland, Glasgow, W.2; manufacturers and merchants. July 5, 1927. (To be associated, Sect. 24.)

"VULCALOSE."

482,312. Class 1. Paints, varnishes, enamels, dry colours, distempers, japans, lacquers, anti-corrosive and anti-fouling compositions and anti-corrosive oils. Pinchin, Johnson and Co., Ltd., General Buildings, Aldwych, London, W.C.2; varnish, colour and paint manufacturers. July 9, 1927. (To be associated, Sect. 24.)

"VULCOSE."

482,422. Class 1. Paints, varnishes, enamels, dry colours, distempers, japans, lacquers, anti-corrosive and anti-fouling compositions and anti-corrosive oils. Pinchin, Johnson and Co., Ltd., General Buildings, Aldwych, London, W.C.7; varnish, colour and paint manufacturers. July 15, 1922. (To be associated, Sect. 24.)



The improved Foamite 34-gallon Metering Type Engine. (*Patented*)

A halt to Fire's Destruction

Already enjoying an unrivalled record for efficiency, the value of the Foamite 34-gallon Engine as a unit for fighting either fires involving inflammable liquids or ordinary outbreaks has now been *greatly enhanced*.

The special internal construction of the new metering type engine ensures that the two solutions are automatically measured out in correctly proportioned quantities, and the great advantages obtained will be readily appreciated for the following reasons:—

(*a*) Although the same quantity of each solution is used in the new type of engine as was used in the old, the *Firefoam output* is approximately 50% *greater*.

(*b*) The *discharge period* is lengthened to approximately *four minutes*, so that greater time for manœuvring at a fire is given.

(*c*) *The jet remains steady* during operation—there is no "tailing off" as in the case of the old type.

(*d*) The Firefoam produced by the metering type engine is of excellent quality and *consistent throughout the discharge*.

N.B.—There is no advance in the price of the Foamite 34-gallon Engine.

Submit your fire problems to
Foamite Firefoam Ltd.
55-57 Gt. Marlborough Street,
LONDON, W.1

Foamite Fire Protection

A Complete Engineering Service

Against Fire

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BERRY, Mr. L. V., 72, Solon Road, Brixton, disinfectant merchant. (C.C., 3/9/27.) £15 18s. 4d. July 13.

PHILLI-MIRANO (1926), LTD., 39/49, Groton Road, Earlsfield, S.W., chemists. (C.C., 3/9/27.) £11 9s. 11d. July 20.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

GARBUTT (JOSEPH), LTD., Durham, chemists. (M., 3/9/27.) Registered August 20, £300 debenture, to P. Bergson, 16, Hudson Road, Sunderland, cabinet maker; general charge. *Nil. December 9, 1926.

MINERVA (ROUMANIA) OIL CO., LTD., E.C. (M., 3/9/27.) Registered August 19, £6,000 debentures, part of £18,000; general charge. *Nil. July 2, 1926.

UNIFLO PUMP CO., LTD., Halesowen. (M., 3/9/27.) Registered August 19, £1,500 and £6,000 debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act 1908), present issues £1,000 and £6,000; general charge. *——. December 31, 1925.

Satisfaction

FELL (THOMAS) AND CO., LTD., London, W.C., perfume manufacturers. (M.S., 3/9/27.) Satisfaction registered August 18, £100, registered June 11, 1926.

London Gazette, &c.

Winding Up Petition

SIMILAX, LTD. (W.U.P., 3/9/27.) A creditor's petition for winding-up has been presented, and is to be heard at the Royal Courts of Justice, Strand, London, on October 18.

Companies Winding Up Voluntarily

FAIRFAX, CHEMISTS, LTD. (C.W.U.V., 3/9/27.) By special resolution, August 2, confirmed August 19. A. B. Slack, 15, Christ Church Avenue, West Didsbury, Manchester, company registration agent, appointed as liquidator.

LONDON-OVERSEAS OIL CO., LTD. (C.W.U.V., 3/9/27.) By special resolution, July 29; confirmed August 15. R. P. Chambers, 60, Queen Victoria Street, E.C.4, chartered accountant, appointed as liquidator.

Partnership Dissolved

KNOWLES AND PHILLIPS (James Arthur PHILLIPS and Charles John KNOWLES), chemists and druggists, 47, Minories, London, as from August 22, 1927. Debts received and paid by J. A. Phillips, who will continue the business.

Receiverships

BRITISH AND COLONIAL CHEMICAL CO., LTD. (R., 3/9/27.) C. R. Akers, F.C.A., of 1, Queen Victoria Street, E.C.4, ceased to act as receiver or manager on August 10, 1927.

RYLAND BARYTES AND SILICA CO., LTD. (R., 3/9/27.) C. H. Closh, of 3, Bellevue Mansions, Forest Hill, S.E.23, ceased to act as receiver on August 3, 1927.

A Heat and Pressure Resisting Glass

A NEW process of manufacture of a glass capable of withstanding pressure, heat and acids, is claimed to have been developed in Germany, states the *Industrial Australian*. The process is said to be the result of years of experimentation by a German glass manufacturer, and the glass which is produced is reported to be considerably superior to any other kind yet known with regard to its power of resistance against fluctuations of temperature and pressure. In the beginning, the new glass was used only for the manufacture of glass tube water gauges and glass bars. At a recent test, the newest tubes produced by the new method are said to have sustained a cold-water pressure of 20, 45, 65, 80, and 100 atmospheres. The new glass is now also used in weaving and silk-spinning mills, where, it is said, it is employed to replace bobbins of wood.

A Catalogue of Chemical Plant

PRODUCTS of the Soho Foundry are described in a catalogue received recently from Joseph Foster and Sons, Soho Foundry, Preston. Established for nearly a century, this firm has acquired a specialised knowledge of steam and chemical plant which they are prepared to place at the disposal of any chemical engineer requiring plant for the chemical, rubber and allied industries, boilers, steam engines, or mill gearing. Included in the plant described are autoclaves for use in chemical and rubber works, and agitating tanks for stirring benzol and similar liquors at constant speed and even temperatures. Storage tanks and stills are given particular attention, and the last pages of the booklet deal with Lancashire boilers and prime movers. A further pamphlet deals with the ink and colour mixers in various sizes, both belt and motor driven. The firm can supply plant to customer's own designs and specifications, but, owing to the cost involved in making expensive patterns, suggests that it is to the advantage of customers, if possible, to use existing standards.

Vacant Appointments

A Lectureship in Biochemistry (Grade I) in the Physiological Department, University of Birmingham. £600. The Secretary. September 21.

A Drapers' Company's Research Scholarship in Dyeing (£100 per annum); a Joseph Blamires Research Scholarship (£100 per annum) and a British Dyes Research Scholarship (£75 per annum), both for research in colour chemistry. The Director of Education, The Technical College, Huddersfield.

A Research Assistant for Soil Survey Work in the Department of Agriculture, University College of North Wales, Bangor. Degree in chemistry essential. £200. The Secretary and Registrar. September 10.

A Part-time Teacher of Chemistry at the Technical School, Southport. The Director of Education, Southport.

An Assistant for the collation of records in the Records Department of the Department of Scientific and Industrial Research, £200–£250. The Secretary, 16, Old Queen Street, Westminster, London. September 12.

A London firm requires a man to start a department for handling thickeners, including the selling and starting up of plant and recommending the correct equipment for a given problem. Apply to THE CHEMICAL AGE.

Benn Brothers' Other Journals

THE CABINET MAKER.—The Future of Cabinet Making; Lectures on Timber; How to Stimulate Autumn Trade; Goods on Approbation.

DISCOVERY.—British Association Number; "Bird Migration: A Criticism of Accepted Views," by Commander B. Ackworth; Television on the Continent; "Ancient Man at Hoxne, Suffolk," by J. Reid Weir; A Unique Translation of Goethe's "Faust."

THE ELECTRICIAN.—"Mains for Residential Districts," by H. M. Sayers; Development in Rural Areas; Invention and Progress.

THE FRUIT GROWER.—The Government's Merchandise Marks Policy; U.S.A. and "Residue" Scare; Trees for the Roadsides.

GARDENING ILLUSTRATED.—A Great Display of Flowers at Southport (Illustrated); September Work in the Woodlands; Yuccas in Readers' Gardens; Up-to-date Gaillardias.

THE HARDWARE TRADE JOURNAL.—Annual Lighting Issue; New Lighting Goods for the 1927–28 Season; Handling and Display.

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